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MDCCLXXVIII.

ENCYCLOPEDIA OF D I C T I O N A R Y OF ARTS, SCIENCES, &c.

On a Plan entirely New:

By W. B. E. L.

THE DIFFERENT SCIENCES AND ARTS

Are brought into the Form of DIALOGUE

LETTERS OR SYSTEMS

The History, Theory, and Practice of each,
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Dictionary of Arts, Sciences, &c.

C.

C A A

C THE third letter, and second consonant, of the alphabet, is pronounced like *k* before the vowels *a*, *o*, and *u*; but like *s* before *e*, *i*, and *y*.

As an abbreviation, C stands for Caius, Carolus, Caesar, *condemno*, &c. and CC for *consulibus*.

As a numeral, C signifies 100, CC 200, &c.

C, in music, placed after the cliff, intimates that the music is in common time, which is either quick or slow, as it is joined with allegro or adagio; if alone, it is usually adagio. If the C be crolled or turned, the first requires the air to be played quick, and the last very quick.

CAA-APIA, in botany, the name of a Brazilian plant, described by Marcgrave, Piso, and others; the root of which so much resembles the ipecacuanha in its virtues, that some have erroneously called it by the same name. It is an astringent and emetic as the ipecacuanha; but it possesses both these qualities in a much weaker degree, and is therefore necessarily given in a larger dose, a whole dram being the quantity commonly given at once. The Brazilians bruise the whole plant, and express the juice, which they take internally, and also apply it externally to wounds made by poisoned arrows and by the bites of serpents. Some have supposed the root of this plant to be the white ipecacuanha; but this is an error, that being little different from the grey.

CAABA, or CAABAH, properly signifies a square stone building; but is particularly applied by the Mahometans to the temple of Mecca, built, as they pretend, by Abraham and Ishmael his son.

Before the time of Mahomet, this temple was a place of worship for the idolatrous Arabs, and is said to have contained no less than 360 different images, equalling in number the days of the Arabian year. They were all destroyed by Mahomet, who sanctified the Caaba, and appointed it to be the chief place of worship for all true believers. The temple is in length, from north to south, about 24 cubits; its breadth from east to west, is 23; and its height, 27. The door, which is on the east side, stands about four cubits from the ground; the floor being level with the bottom of the door. In the corner next this door is the *black stone*, so much celebrated among the Mahometans. On the north side of the caaba, within a semicircular inclosure 50 cubits long, lies the *white stone*, said to be the sepulchre of Ishmael, which receives the rain-water from the caaba

C A A

by a spout formerly of wood, but now of gold. The black stone, according to the Mahometans, was brought down from heaven by Gabriel at the creation of the world; and originally of a white colour; but contracted the blackness that now appears on it, from the guilt of those sins committed by the sons of men. It is set in silver, and fixed in the south-east corner of the caaba, looking towards Bafra, about seven spans from the ground. This stone, upon which there is the figure of a human head, is held in the highest estimation among the Arabs; all the pilgrims kissing it with great devotion, and some even calling it the *right-hand of God*. Its blackness, which is only superficial, is probably owing to the kisses and touches of so many people. After the Karmatians had taken Mecca, they carried away this precious stone, and could by no means be prevailed upon to restore it; but finding at last that they were unable to prevent the concourse of pilgrims to Mecca, they sent it back of their own accord, after having kept it 22 years.

The double roof of the caaba is supported within by three octagonal pillars of aloes-wood; between which, on a bar of iron, hang some silver lamps. The outside is covered with rich black damask, adorned with an embroidered band of gold, which is changed every year, and was formerly sent by the khalifs, afterwards by the sultans of Egypt, and is now provided by the Turkish emperors. The caaba, at some distance, is almost surrounded by a circular inclosure of pillars, joined towards the bottom by a low balustrade, and towards the top by bars of silver. Just without this inner inclosure, on the south, north, and west sides of the caaba, are three buildings, which are the oratories or places where three of the orthodox sects assemble to perform their devotions. Towards the south-east stands an edifice which covers the well Zemzem, the treasury, and the cupola of Al Abbas. Formerly there was another cupola, that went under the name of the *hemicycle*, or *cupola of Judea*: but whether or not any remains of that are now to be seen, is unknown; nor is it easy to obtain information in this respect, all Christians being denied access to this holy place. At a small distance from the caaba, on the east side, is the *station* or *place of Abraham*; where is another stone much respected by the Mahometans; and where they pretend to shew the footsteps of the patriarch, telling us he stood on it when he built the caaba. Here the fourth feet

Caaba.

of Arabs, viz. that of Al Shafei, assemble for religious purposes.

The square colonnade, or great piazza, that at a considerable distance incloses these buildings, consists, according to Al Jannabi, of 448 pillars, and has no less than 38 gates. Mr Sale compares this piazza to that of the royal exchange at London, but allows it to be much larger. It is covered with small domes or cupolas, from the four corners of which rise as many minarets or steeples, with double galleries, and adorned with gilded spires and crescents after the Turkish manner, as are also the cupolas which cover the piazza and other buildings. Between the columns of both inclosures hang a great number of lamps, which are constantly lighted at night. The first foundations of this second inclosure were laid by Omar the second khalif, who built no more than a low wall, to prevent the court of the casba from being incroached upon by private buildings; but by the liberality of succeeding princes, the whole has been raised to that state of magnificence in which it appears at present.

This temple enjoys the privilege of an asylum for all sorts of criminals; but it is most remarkable for the pilgrimages made to it by the devout muslulmans, who pay so great a veneration to it, that they believe a single sight of its sacred walls, without any particular act of devotion, is as meritorious, in the sight of God, as the most careful discharge of one's duty, for the space of a whole year, in any other temple.

CAAMINI, in botany, a name given by the Spaniards and others to the finest sort of Paraguayan tea. It is the leaf of a shrub which grows on the mountains of Maracaya, and is used in Chili and Peru as the tea is with us. The mountains where this shrub grows naturally are far from the inhabited parts of Paraguay; but the people of the place know so well the value and use of it, that they constantly furnish themselves with great quantities of it from the spot. They used to go out on these expeditions many thousands together; leaving their country in the mean time exposed to the insults of their enemies, and many of themselves perishing by fatigue. To avoid these inconveniences, they have of late planted these trees about their habitations; but the leaves of these cultivated ones have not the fine flavour of those that grow wild. The king of Spain has permitted the Indians of Paraguay to bring to the town of Saintfoy 12,000 arrobes of the leaves of this tree every year, but they are not able to procure so much of the wild leaves annually: about half the quantity is the utmost they bring of this: the other half is made up of the leaves of the trees in their own plantations; and this sells at a lower price, and is called *pabos*. The arrobe is about 25 pound weight; the general price is four piastras; and the money is always divided equally among the people of the colony.

CAANA, or KAANA, a town in Upper Egypt, seated on the eastern banks of the river Nile, from whence they carry corn and pulse for the supply of Mecca in Arabia. E. Long. 32. 23. N. Lat. 24. 30. Here are several monuments of antiquity yet remaining, adorned with hieroglyphics.

CAB, an Hebrew dry measure, being the sixth part of a seah or satum, and the 18th part of an ephah. A cab contained 2½ pints of our corn-measure: a quarter

cab was the measure of dove's dung, or more properly a sort of chick-pease called by this name, which was sold at Samaria, during the siege of that city, for five shekels.

CABAL, an apt name currently given to the infamous ministry of Charles II. composed of five persons, Clifford, Ashley, Buckingham, Arlington, and Lauderdale; the first letters of whose names, in this order, furnished the appellation by which they were distinguished.

CABALIST, in French commerce, a factor or person who is concerned in managing the trade of another.

CABALLARIA, in middle-age writers, lands held by the tenure of furnishing a horseman, with suitable equipage, in time of war, or when the lord had occasion for him.

CABALLEROS, or CAVALLEROS, are Spanish wools, of which there is a pretty considerable trade at Bayonne in France.

CABALLINE, denotes something belonging to horses: thus caballine aloes is so called, from its being chiefly used for purging horses; and common brimstone is called *sulphur caballinum* for a like reason.

CABALLINUM, (anc. geog.), a town of the *Ædui* in Gallia Celtica; now *Challon sur Saone*, which see.

CABALLINUS, (anc. geog.), a very clear fountain of mount Helicon in Beotia; called *Hippocrene* by the Greeks, because opened by Pegasus on striking the rock with his hoof, and hence called *Pegasus*.

CABALLIO, or CABELLIO, (anc. geog.), a town of the Cavares in Gallia Narbonensis, situated on the Druentia. One of the Latin colonies, in the Notitiæ called *Civitas Cabelliorum*. Now *Cavaillon* in Provence. See CAVAILLON.

CABBAGE, in botany. See BRASSICA.—In the Geographical essays, we find this plant greatly recommended as an excellent food for cattle, producing much dung, and being an excellent substitute for hay. The author prefers the Scotch kind, as being most durable, and preferable on all other accounts. He also recommends autumn-sowed plants in preference to those sowed in the spring; the former producing a much more weighty crop than the latter. The expence of raising an acre of good cabbages he values at 14*l.* 15*s.* and its produce at 34*l.*

CABBAGE-Tree, the English name of a species of PALMA.

CABBALA, according to the Hebrew style, has a very distinct signification from that wherein we understand it in our language. The Hebrew cabbala signifies tradition; and the Rabbins, who are called *cabbalists*, study principally the combination of particular words, letters, and numbers, and by this means pretend to discover what is to come, and to see clearly into the sense of many difficult passages of scripture. There are no sure principles of this knowledge, but it depends upon some particular traditions of the ancients; for which reason it is termed *cabbala*.

The cabbalists have abundance of names which they call *sacred*; these they make use of in invoking of spirits, and imagine they receive great light from them. They tell us, that the secrets of the cabbala were discovered to Moses on mount Sinai; and that these have been delivered to them down from father to son, without interruption, and without any use of letters; for

to write them down, is what they are by no means permitted to do. This is likewise termed the *oral law*, because it passed from father to son, in order to distinguish it from the written laws.

There is another cabbala, called *artificial*, which consists in searching for abstruse and mysterious significations of a word in Scripture, from whence they borrow certain explanations, by combining the letters which compose it: this cabbala is divided into three kinds, the gematric, the notaricon, and the temura or temurah. The first whereof consists in taking the letters of a Hebrew word for ciphers or arithmetical numbers, and explaining every word by the arithmetical value of the letters whereof it is composed. The second sort of cabbala, called *notaricon*, consists in taking every particular letter of a word for an entire diction; and the third, called *temurah*, i. e. change, consists in making different transpositions or changes of letters, placing one for the other, or one before the other.

Among the Christians, likewise, a certain sort of magic is, by mistake, called *cabbala*; which consists in using improperly certain passages of Scripture for magic operations, or in forming magic characters or figures with stars and talismans.

Some visionaries among the Jews, believe, that Jesus Christ wrought his miracles by virtue of the mysteries of the cabbala.

CABBALISTS, the Jewish doctors who profess the study of the cabbala.

In the opinion of these men, there is not a word, letter, or accent in the law, without some mystery in it. The Jews are divided into two general sects; the karaites, who refuse to receive either tradition or the talmud, or any thing but the pure text of scripture; and the rabbinites, or talmudists, who, besides this, receive the traditions of the ancients, and follow the talmud.

The latter are again divided into two other sects; pure rabbinites, who explain the scripture, in its natural sense, by grammar, history, and tradition; and cabbalists, who, to discover hidden mystical senses, which they suppose God to have couched therein, make use of the cabbala, and the mystical methods above mentioned.

CABECA, or CABBESSE, a name given to the finest silks in the East Indies, as those from 15 to 20 per cent. inferior to them are called *barina*. The Indian workmen endeavour to pass them off one with the other; for which reason, the more experienced European merchants take care to open the bales, and to examine all the skins one after another. The Dutch distinguish two sorts of cabecas; namely, the moor cabeca, and the common cabeca. The former is sold at Amsterdam for about 21½ schellingen Flemish, and the other for about 18½.

CABECA de Vide, a small sea-port town of Alentejo in Portugal, with good walls, and a strong castle. W. Long. 6. 43. N. Lat. 39. 0.

CABENDA, a sea-port of Congo in Africa, situated in E. Long. 12. 2. S. Lat. 4. 5.

CABES, or CABBES, a town of Africa, in the kingdom of Tunis, seated on a river near the gulf of the same name. E. Long. 10. 55. N. Lat. 33. 40.

CABEZZO, a province of the kingdom of Angola

in Africa; having Oacco on the north, Lubolo on the south, the Coanza on the north-east, and the Reinba on the south-west. It is populous, and well stored with cattle, &c. and hath a mine of iron on a mountain from thence called the *iron mountain*, which yields great quantities of that metal; and this the Portuguese have taught the natives to manufacture. This province is watered by a river called *Rio Longo*, and other small rivulets, lakes, &c. The trees here are vastly large; and they have one sort not unlike our apple-trees, the bark of which being flaked with a knife, yields an odoriferous resin of the colour and consistency of wax, and very medicinal in its nature, only a little too hot for Europeans, unless qualified by some cooling drug.

CABIDOS, or CAVIDOS, a long measure used at Goa, and other places of the East Indies belonging to the Portuguese, to measure stuffs, linens, &c. and equal to $\frac{3}{4}$ of the Paris ell.

CABIN, a room or apartment in a ship where any of the officers usually reside. There are many of these in a large ship; the principal of which is designed for the captain or commander. In ships of the line this chamber is furnished with an open gallery in the ship's stern, as also a little gallery on each quarter. The apartments where the inferior officers or common sailors sleep and mess are usually called *BIRTHS*; which see.

The bed-places built up for the sailors at the ship's side in merchantmen are also called *cabin*.

CABINET, the most retired place in the finest part of a building, set apart for writing, studying, or preserving any thing that is precious.

A complete apartment consists of a hall, anti-chamber, chamber, and cabinet, with a gallery on one side. Hence we say, a cabinet of paintings, curiosities, &c.

CABINET, also denotes a piece of joiner's workman-ship, being a kind of press or chest, with several doors and drawers.

There are common cabinets of oak or of chestnut, varnished cabinets of China and Japan, cabinets of inlaid work, and some of ebony, or the like scarce and precious woods.

Formerly the Dutch and German cabinets were much esteemed in France; but are now quite out of date, as well as the cabinets of ebony which came from Venice.

CABIRI, a term in the theology of the ancient Pagans, signifying great and powerful gods; being a name given to the gods of Samothracia. They were also worshipped in other parts of Greece, as Lemnos and Thebes, where the cabiria were celebrated in honour of them; these gods are said to be, in number, four, viz. Axieros, Axiocerca, Axiocerus, and Casmilus.

CABIRIA, festivals in honour of the Cabjri, celebrated in Thebes and Lemnos, but especially in Samothracia, an island consecrated to the Cabiri. All who were initiated into the mysteries of these gods, were thought to be secured thereby from storms at sea, and all other dangers. The ceremony of initiation was performed by placing the candidate, crowned with olive-branches, and girded about the loins with a purple ribband, on a kind of throne, about which the priests, and persons before initiated, danced.

CABLE, a thick, large, strong rope, commonly of hemp, which serves to keep a ship at anchor.

There

Cable.

There is no merchant-ship, however weak, but has at least three cables; namely, the chief cable, or cable of the sheet-anchor, a common cable, and a smaller one.

Cable is also said of ropes, which serve to raise heavy loads, by the help of cranes, pulleys, and other engines. The name of *cable* is usually given to such as have, at least, three inches in diameter; those that are less are only called *ropes*, of different names according to their use.

Every cable, of whatsoever thickness it be, is composed of three strands; every strand of three ropes; and every rope of three twists: the twist is made of more or less threads, according as the cable is to be thicker or thinner.

In the manufacture of cables, after the ropes are made, they use sticks, which they pass first between the ropes of which they make the strands, and afterwards between the strands of which they make the cable, to the end that they may all twist the better, and be more regularly wound together; and also, to prevent them from twining or entangling, they hang, at the end of each strand and of each rope, a weight of lead or of stone.

The number of threads each cable is composed of is always proportioned to its length and thickness; and it is by this number of threads that its weight and value are ascertained: thus, a cable of three inches circumference, or one inch diameter, ought to consist of 48 ordinary threads, and to weigh 192 pounds; and on this foundation is calculated the following table, very useful for all people engaged in marine commerce, who fit out merchantmen for their own account, or freight them for the account of others.

A table of the number of threads and weight of cables of different circumferences.

Circumf.	Threads.	Weight.
3 inches	48	192 pounds.
4	77	308
5	121	484
6	174	696
7	238	952
8	311	1244
9	393	1572
10	485	1940
11	598	2392
12	699	2796
13	821	3284
14	952	3808
15	1093	4372
16	1244	4976
17	1404	5616
18	1574	6296
19	1754	7016
20	1943	7772

Sheet-Anchor Cable, is the greatest cable belonging to a ship.

Stream Cable, a hawser or rope, something smaller than the bowers, and used to moor the ship in a river or haven, sheltered from the wind and sea, &c.

Serve or Plate the Cable, is to bind it about with ropes, cloths, &c. to keep it from galling in the hawse.

To Splice a Cable, is to make two pieces fast together, by working the several threads of the rope the one into the other.

Pay more Cable, is to let more out of the ship. *Pay cheap the Cable*, is to hand it out apace. *Veer more Cable*, is to let more out, &c.

Cable's Length, a measure of 120 fathoms, or of the usual length of the cable.

CABLED, in heraldry, a term applied to a cross formed of the two ends of a ship's cable; sometimes also to a cross covered over with rounds of rope; more properly called a *cross corded*.

CABLED Flute, in architecture, such flutes as are filled up with pieces in the form of a cable.

CABO DE ISTRIA, the capital town of the province of Istria, in the territory of Venice; and the see of a bishop. It is seated on a small island in the gulf of Venice, and is joined to the main land by draw-bridges. E. Long. 14. 22. N. Lat. 45. 49.

CABOCHED, in heraldry, is when the heads of beasts are borne without any part of the neck, full-faced.

CABOLETTO, in commerce, a coin of the republic of Genoa, worth about 3 d. of our money.

CABOT (Sebastian), the first discoverer of the continent of America, was the son of John Cabot a Venetian. He was born at Bristol in 1477; and was taught by his father, arithmetic, geometry, and cosmography. Before he was 20 years of age he made several voyages. The first of any consequence seems to have been made with his father, who had a commission from Henry VII. for the discovery of a north-west passage to India. They failed in the spring of 1497; and proceeding to the north-west they discovered land, which for that reason they called *Prinavista*, or *Newfoundland*. Another smaller island they called *St John*, from its being discovered on the feast of St John Baptist; after which, they sailed along the coast of America as far as Cape Florida, and then returned to England with a good cargo, and three Indians aboard. Stowe and Speed ascribe these discoveries wholly to Sebastian, without mentioning his father. It is probable that Sebastian, after his father's death, made several voyages to these parts, as a map of his discoveries, drawn by himself, was hung up in the privy-garden at Whitehall. However, history gives but little account of his life for near 20 years; when he went to Spain, where he was made pilot-major, and intrusted with reviewing all projects for discoveries, which were then very numerous. His great capacity and approved integrity induced many eminent merchants to treat with him about a voyage by the new found straits of Magellan to the Moluccas. He therefore failed in 1525, first to the Canaries; then to the Cape Verde islands; thence to St Augustine, and the island of Patos; when some of his people beginning to be mutinous, and refusing to pass through the straits, he laid aside the design of failing to the Moluccas; left some of the principal mutineers upon a desert island; and, failing up the rivers of Plate and Paraguay, discovered, and built forts in, a large tract of fine country, that produced gold, silver, and other rich commodities. He thence dispatched messengers to Spain for a supply of provisions, ammunition, goods for trade, and a recruit of men: but his request not being readily complied with, after staying five years in America, he returned home; where he met with a cold reception, the merchants being displeased at his not having pursued his voyage to the Moluccas,

Cable
Cabot.

Moluccas, while his treatment of the mutineers had given umbrage at court. Hence he returned to England; and being introduced to the duke of Somerset, then lord protector, a new office was erected for him: he was made governor of the mystery and company of the merchant-adventurers for the discovery of regions, dominions, islands, and places unknown; a pension was granted him, by letters-patent, of 166*l.* 13*s.* 4*d.* per annum; and he was consulted in all affairs relative to trade. In 1522, by his interest, the court fitted out some ships for the discovery of the northern parts of the world. This produced the first voyage the English made to Russia, and the beginning of that commerce which has ever since been carried on between the two nations. The Russia company was now founded by a charter granted by Philip and Mary; and of this company Sebastian was appointed governor for life. He is said to be the first who took notice of the variation of the needle, and who published a map of the world. The exact time of his death is not known, but he lived to be above 70 years of age.

CABRA, a town of the kingdom of Tombut in Africa. It is a large town, but without walls; and is seated on the river Niger, about 12 miles from Tombut. The houses are built in the shape of bells; and the walls are made with stakes or hurdles, plastered with clay, and covered with reeds after the manner of thatch. This place is very much frequented by negroes who come here by water to trade. The town is very unhealthy, which is probably owing to its low situation. The colour of the inhabitants is black, and their religion a sort of Mahometanism. They have plenty of corn, cattle, milk, and butter; but salt is very scarce. The judge who decides controversies is appointed by the king of Tombut. E. Long. o. 50. N. Lat. 14. 21.

CABUL, or GABOUL, a city of Asia, and capital of the province of Cabulistan. It lies in E. Long. 68. 15. N. Lat. 33. 30. on the frontiers of Great Bukharia, on the south side of the mountains which divide the territories of the Mogul from that part of Great Tary. It is one of the finest places in that part of the world; large, rich, and very populous. As it is considered as the key of the Great Mogul's dominions on that side, great care is taken to keep its fortifications in repair, and a numerous garrison is maintained for its security. It lies in the road between Samarcand and Lahor; and is much frequented by the Tartars, Persians, and Indians. The Ubeck Tartars drive there a great trade in slaves and horses, of which it is said that no fewer than 60,000 are sold annually. The Persians bring black cattle and sheep, which renders provisions very cheap. They have also wine, and plenty of all sorts of eatables. The city stands on a little river which falls into the Indus, and thereby affords a short and speedy passage for all the rich commodities in the country behind it, which, when brought to Cabul, are there exchanged for slaves and horses, and then conveyed by merchants of different countries to all parts of the world. The inhabitants are most of them Indian pagans, though the officers of the Mogul and most of the garrison are Mahometans.

CABULISTAN, a province of Asia, formerly belonging to the Great Mogul; but ceded in 1739 to Koulî Khan, who at that time governed Persia. It is

bounded on the north by Bukharia, on the east by Cashemire, on the west by Zabulistan and Candahar, and on the south by Multan. It is 250 miles in length, 240 in breadth, and its chief town is Cabul. This country in general is not very fruitful; but in the vales they have good pasture-land. The roads are much infested with banditti; which obliges the natives to have guards for the security of travellers. The religion of the Cabulists is pagan; and their extraordinary time of devotion is the full moon in February, and continues for two days. At this time they are clothed in red, make their offerings, dance to the sound of the trumpet, and make visits to their friends in masquerade dresses. They say, their god Crusman killed a giant who was his enemy, and that he appeared like a little child; in memory of which, they cause a child to shoot at the figure of a giant. Those of the same tribe make bonfires, and feast together in a jovial manner. The moral part of their religion consists in charity; for which reason, they dig wells and build houses for the accommodation of travellers. They have plenty of provisions, mines of iron, myrobolans, aromatic woods, and drugs of many kinds. They carry on a great trade with the neighbouring countries; by which means they are very rich, and are supplied with plenty of all things.

CABURNS, on ship-board, are small lines made of spun yarn, to bind cables, seize tackles, or the like.

CACALIA, FOREIGN COLTSFOOT; a genus of the syngenesia order, belonging to the polygamia aequalis class of plants.

Species. 1. The suaveolens, with a herbaceous stalk, is a native of North America. It hath a perennial creeping root which sends out many stalks, garnished with triangular spear-shaped leaves sharply sawed on their edges, of a pale green on their under side, but a deep shining green above, placed alternately. The stalks rise to the height of seven or eight feet, and are terminated by umbels of white flowers, which are succeeded by oblong seeds covered with down. It flowers in August, and the seeds ripen in October. The stalks decay in autumn, and new ones rise in the spring. This plant multiplies greatly by its spreading roots, as also by the seeds which are spread to a great distance by the wind, the down which adheres to them being greatly assisting to their conveyance. The roots which have been calc out of Chelsea garden, being carried by the tides to a great distance, have fixed themselves to the banks of the river, and increased so much, that in a few years this species may probably appear as a native of England. 2. The ficoides is a native of the Cape of Good Hope. It rises with strong round stalks to the height of seven or eight feet, woody at bottom, but soft and succulent upward, sending out many irregular branches, garnished more than half their length with thick, taper, succulent leaves, a little compressed on two sides, ending in points, covered with a whitish glaucous farina, which comes off when handled. These, when broken, emit a strong odour of turpentine, and are full of a viscid juice; at the extremity of the branches the flowers are produced in small umbels; they are white, tubulous, and cut into five parts at the top. Some of the French noblemen have the leaves of this plant pickled; in doing of which they have a contrivance to preserve the white farina with which they are covered, and thereby render them very beautiful. 3. The kleinia, with a compound

Cacalia.

compound shrubby stalk, grows naturally in the Canary islands, but has been long cultivated in the English gardens. It rises with a thick fleshy stem divided at certain distances, as it were, into so many joints. Each of these divisions swell much larger in the middle than they do at each end; and the stalks divide into many irregular branches of the same form, which, toward their extremities are garnished with long, narrow, spear-shaped leaves of a glaucous colour, standing all round the stalks without order. As they fall off, they leave a scar at the place, which always remains on the branches. The flowers are produced in large clusters at the extremity of the branches, which are tubulous, and of a faint carnation colour. They appear in August and September, but continue great part of October, and are not succeeded by seeds in this country. There have been stones and fossils dug up at a very great depth in some parts of England having very perfect impressions of this plant upon them; from whence Dr Woodward has supposed the plants were lodged there at the universal deluge; and finding the impressions of many other plants and animals which are natives of those islands, he concludes that the waters flowed hither from the south-west. This plant has been called the *cabbage-tree*, from the resemblance which the stalk of it has to the cabbage: others have intitled it *carnation-tree*, from the shape of the leaves and the colour of the flowers. Besides these, there are seven other species, *viz.* the alpina, with kidney-shaped leaves; the glabra, with smooth leaves; the atriplicifolia, with heart-shaped sinuated leaves; the papillaris, with a shrubby stalk guarded on every side with broken rough footstalks; the ante-euphorbium, with oblong oval leaves; the sonchifolia, with lyre-shaped indented leaves; and the lutea, with leaves divided into five acute parts.

Culture. All the three species described above are very easily propagated. The first will propagate itself, as already mentioned, either by roots or seeds. The second is easily propagated by cuttings during the summer months: these should be cut from the plants and laid to dry a fortnight, that the wound may be healed over before they are planted. Most people plunge the pots in which these are planted into an hot-bed, to promote their putting out roots; but if planted in June or July, they will root as well in the open air. Even branches broken off by accident have frequently put out roots when fallen on the ground, without any care. These branches may be kept six months out of the ground, and will take root if planted. This should have a light sandy earth, and in winter be placed in an airy glass-case, where they may enjoy the sun and air in mild weather, but must be protected from frost. During the winter season the plants must have but little water; and in summer, when they are placed in the open air, it should not be given to them too often, nor in great quantity. The third is also propagated by cuttings, and the plants require the same culture; but must have a dry warm glass-case in winter, and very little water, being subject to rot with wet. In summer they must be placed in the open air in a warm sheltered situation, and in very dry weather refreshed moderately with water. With this management the plants will flower annually, and grow to the height of eight or ten feet.

Cacao.

CACAO, the CHOCOLATE-NUT TREE, is by Linnaeus joined to the theobroma, a genus of the pentandria order, belonging to the polyadelphia class of plants; but of the true chocolate-nut there is only one species known, which we therefore choose to describe separately. The tree producing it is by Mr Catesby said to be about 8 inches in thickness, and 12 feet in height, with a smooth shining bark. The leaves grow alternately, are broad and pointed, set on flat pedicles near an inch long. The flowers come forth only from the trunk and larger branches, in clusters of about eight or ten; each flower consisting of five capular leaves, and five petals, with lamina, and a stylus. To one of these little tufts of blossoms usually succeeds a single fruit about the size of a swan's egg, but longer, more tapering, and ending in a point. The fruit hangs pendant; and, when ripe, has a shell of a purple colour, in substance somewhat like that of a pomegranate, and furrowed from end to end; containing in the middle many kernels of the size of acorns, inclosed in a mucilaginous substance, and which are known amongst us by the name of *cacao-nuts*, of which CHOCOLATE is made. See Plate LXVI. fig. 1. where n° 1. shews the fruit hanging on the tree; and n° 2. is a transverse section of the nut, shewing the included kernels.

This tree is a native of America, and no other part of the world. The places of its growth, according to Mr Catesby, are the bay of Campeachy on Costa Rica between Portabel and Nicaragua, the coast of Coracoco, Guajaquil, and Colima. All the sugar islands, however, are proper for its cultivation; and the same author assures us, that, in the year 1714, he saw the remains of extensive cacao-walks planted by the Spaniards while in possession of that island; and he complains very much of the neglect of its cultivation by the British planters. Mr Miller, after making complaints of the same kind, gives directions, to the following purpose, for cultivating the chocolate-tree.

The proper situation for chocolate-trees is in a place where they may be protected from the winds, which would soon destroy them. Such places, therefore, where torrents of water have washed away the earth so as to leave broad and deep furrows, are very proper for this purpose. The soil in these *gullies* (as the inhabitants call them) is very rich and moist, which the chocolate-trees require, and where they will thrive exceedingly; but where there are not a sufficient number of gullies, choice should be made of a situation well sheltered by large trees; or if there are not trees already grown, there should be three or four rows planted round the spot which is designed for the chocolate-trees, of such sorts as are of the quickest growth; and within these rows should be some plantain-trees planted at proper distances, which, being very quick of growth, and the leaves very large, will afford a kindly shelter to the young chocolate-trees planted between them. As the chocolate-trees do not spread their branches very wide, it will be sufficient to place the plantain-trees 24 feet asunder; in which case, there may be two rows of chocolate-trees between them, placing them at ten feet distance from each other in the row. Before the plantation is begun, the ground should be well prepared by digging it deep, and clearing it from roots of trees and noxious plants, which, if suffered to remain in the ground, will shoot up again after the first rain, and greatly

greatly obstruct the growth of the cacao-plants. When the ground is thus prepared, the rows should be marked out by a line where the nuts are to be planted, so as that they may be placed in a quincunx order, at equal distance every way, or at least that the plantain-trees between them may form a quincunx with the two rows of chocolate-trees which are placed between them. The nuts should be planted in a rainy season, and in the places where they are to remain, for they seldom bear transplanting. As the fruit ripens at two different seasons, viz. at Midsummer and at Christmas, the plantation may be made at any of these times; but care must be taken to choose such as are perfectly ripe and sound, otherwise the whole trouble and expence will be lost. The manner of planting is to make three holes in the ground, within two or three inches of each other, at the place where every tree is to stand; and into each of these holes one nut should be planted about two inches deep, covering them gently with earth. The reason of planting three nuts is, that they seldom all grow; or if they do, all are not equally vigorous; so that, when the plants have had one year's growth, it will be easy to draw up the weak unpromising plants, and leave the most vigorous. It is proper, however, to observe, that the chocolate-nuts will not retain their power of vegetation long after they are taken from the trees: so that there is no possibility of transporting them to any great distance for planting; nor should they be kept long out of the ground in the natural places of their growth. When the chocolate-trees first appear above ground, they are very tender, and subject to great injuries from the winds, sun, or drought: for these reasons, besides the shelter of trees already mentioned, it would be proper to have the plantation near a river, and to plant a row of cassada* on each side of the rows of chocolate-trees, which will grow about seven or eight feet high, and screen the young plants from the violence of the sun the first season; after which they will be in less danger therefrom; and the following season, when the cassada is taken up for use, the ground should be worked between the young plants, taking care not to injure their roots by the operation. The plantain-trees should be set two or three months before the chocolate-nuts are ripe, that they may be large enough to afford shelter to the young plants; and the cassada is always planted a month or six weeks before the chocolate-nuts, for the same reason. Some people, instead of cassada, plant potatoes or cucumbers and melons between the young chocolate-plants: but where this is done, it must be with great caution; for if suffered to approach too near the plants, they will greatly injure, if not totally destroy, them. In about seven or eight days after the chocolate-nuts are planted, the young plants will begin to appear above ground; when they should be carefully looked over, to see if any of them are attacked by insects; in which case, these insects must be destroyed, or they will soon devour the plants; or if there are any weeds produced near the plants, they should be carefully cut down with a hoe. About 20 days after the plants have appeared, they will be five or six inches high, and have four or six leaves according to the strength of the plants. In about a year, they will be two feet and an half high, and have 14 or 16 leaves. By this time the cassada, which was planted between the rows of chocolate-plants, will have large roots fit

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for use, therefore should be taken up; and the ground being then wrought over again will greatly encourage the young chocolate-plants. In two years time the young trees will have grown to the height of three feet and an half or four feet, and many of them will begin to flower. These early blossoms, however, should be carefully taken off; for if permitted to remain and produce fruit, they will so much weaken the trees, that they seldom recover their strength again so as to become vigorous. In half a year after, they will produce flowers again; and these also should be all pulled off; none being left to produce fruit till the third year, and then but a few in proportion to the strength of the trees. By following this method, the trees will always produce larger and better nourished fruit than those which are suffered to bear a greater quantity, and will continue much longer in vigour. The fourth year, the trees may be suffered to bear a moderate crop; but even then it is better to pull off some flowers from those trees which are weak, that they may recover strength before they are too old. From the time when the flowers fall off to the maturity of the fruit is about four months.

When the fruit is ripe, the planters generally employ a negro for every row of trees, to gather it. Being furnished with a basket, he goes from tree to tree, cutting off all the ripe fruit. When the basket is full, the fruit is laid on a heap at one end of the plantation; where, after the whole is gathered, they cut the pods lengthwise, and take out all the nuts, carefully divesting them of the pulp adhering to them. Then they carry them to the house, where they lay them in large casks, or other vessels of wood raised above the ground, covering them with leaves of the Indian reed, and mats, upon which they lay some boards, putting stones thereon to keep them down close in order to press the nuts. In these vessels the nuts are kept four or five days; during which time they must be stirred and turned every morning; otherwise they will be in danger of perishing from the great fermentation they are usually in. Without this fermentation, it is said, the nuts will not keep, but sprout if they are in a damp place, or shrivel and dry too much if they are exposed to heat. After the nuts have been thus fermented, they should be taken out of the vessels, and spread on coarse cloths where they may be exposed to the sun and wind; but at night, or in rainy weather, they must be taken under shelter, otherwise the damp will spoil them. If the weather proves fair, three days time will be long enough to dry them, provided they are carefully turned from time to time, that they may dry equally on every side. When they are perfectly dry, they may be put into boxes or sacks, and preserved in a dry place until they are shipped off or otherwise disposed of. The fresher these nuts are, the more oil is contained in them; so that the older they are, the less they are esteemed. The chocolate-trees, if planted on a good soil, and properly taken care of, will continue vigorous and fruitful 25 or 30 years. Besides all the above-mentioned cultivation, they require their dead and decayed branches to be taken off, and likewise the small ill-placed branches to be removed. This, however, must be done very cautiously: no vigorous branches should be shortened, nor any large amputations made on these trees; because they abound with a soft, glutinous

9 L

milky

* See *Jatropha*.

milky juice, which will flow out for many days whenever they are wounded, and this greatly weakens the trees. Such branches, however, whose extreme branches are decayed, should be cut off; to prevent the infection from proceeding further; and such branches as are much decayed should be taken off close to the stem of the tree: but this should be performed in dry weather, soon after the crop of fruit is gathered.—Notwithstanding all this tedious work, however, Mr Miller is of opinion that the culture of these trees is the most profitable way in which a plantation can be laid out. Five or six negroes, he says, will be able to manage a plantation of 10,000 trees of this kind. The profit of each tree, he thinks, may be valued at 5 s. annually; in which case, such a plantation would be worth 2500l. *per annum*.

In order to cultivate this plant in Europe by way of curiosity, it will be necessary to have the nuts planted in boxes of earth (in the countries where they grow) soon after they are ripe, because they will otherwise lose the power of vegetation before they arrive. When the plants begin to appear above ground, they should be carefully watered in dry weather, and protected from the violent heat of the sun, which is very injurious to these plants, especially while they are young. They should also be very clear from weeds; which, if suffered to grow in the boxes, would soon overbear and destroy the plants. When they are grown strong enough to transport, they should be shipped, and placed where they may be screened from strong winds, salt water, and the violent heat of the sun. During their passage, they must be frequently refreshed with water; but it must not be given them in great quantities, or they will be in danger of rotting. When they come into a cool climate, they must be carefully protected from the cold, and will not require water so frequently. When arrived in Britain, they should be carefully taken out of the boxes, and each transplanted into a separate pot filled with light rich earth, and plunged into a moderate hot-bed of tanner's bark, being careful to cover the glasses in the heat of the day to screen them from the sun: they must also be frequently watered; but it must be done with caution, not to rot their roots. In this hot-bed the plants may remain till Michaelmas; when they must be removed into the bark-house, and plunged into the tan in the warmest part of the stove. They are too tender to live in the open air in this country, even at the warmest season of the year; and therefore they must be constantly kept in the stove, observing in summer to give them plenty of fresh air, and in winter to keep them very warm. This close confinement in the house makes them subject to contract stink; for which reason they must be frequently washed, or they would be over-run with insects.

The Spaniards and Portuguese were the first Europeans whom the Americans made acquainted with cacao. They made use of it many years without communication thereof to any other nations. So little was it known in those days, that the Dutch privateers, being ignorant of the value of the prizes of cacao they took, used to throw all the nuts into the sea, calling them in derision *sheep's treading*. In the year 1649, they knew but of one cacao-tree in all the Antilles; and this was planted out of curiosity in the garden of an Englishman settled in the island of St Croix. In 1655, the

Caribs shewed to Mons. du Parquet several cacao-trees in the woods of the island of Martinico, of which he was the owner. This discovery gave occasion to that of several other trees of the same kind in other woods of that island; and the cacao-walks afterwards planted there very probably owed their origin to the nuts taken from these woods. One Benjamin planted there the first cacao-walk about the year 1660; but it was not till 20 or 25 years after that the inhabitants of this island began to apply themselves to the cultivation of these trees, so as to make walks or plantations of them. There are some places in America where the cacao nuts or grains are used as money, but only among the natives: they give 12 or 14 grains for a Spanish rial. The uses to which cacao is put may be reduced to three. It is made into a sweet-meat; also into chocolate (see CHOCOLATE); and there is an oil extracted from it to which they also give the name of *butter*. The oil is as sweet as that of almonds, and is made after the same manner. Some of the Creolian ladies of America use it as a cosmetic, to render the complexion fresh, and the skin soft and smooth. The cacao of the Caraccas is sold at Amsterdam for 8½ stivers per pound, more or less: when it is in casks, they allow 50 much for tare; but when it is in bags, the tare is according to the weight. From 100 to 229 pounds, the tare is reckoned 2 pounds; from 230 to 249, 3 pounds; from 250 to any weight above that, 4 pounds. The serons, to 99 pounds weight, give 8 pounds tare per cask; those of 100 pounds and above, 10 per cent. The cacao of Martinico is commonly in casks, which are tared by the weight. If it is in bags, the same tare is allowed as for that of the Caraccas.

CACERES, a town of Spain, in the province of Extremadura, is seated on the river Saler, and noted for the exceeding fine wool which the sheep bear in the neighbourhood. Between this town and Brocos, there is a wood, where the allies defeated the rear-guard of the duke of Berwick, on the 7th of April, 1706. E. Long. 6.47. N. Lat. 39.15.

CACHALOT, in ichthyology. See PHYSETER. CACHAN, or CASHAN, a considerable town of Persia in Irac Agemi, where they carry on an extensive trade in silks, silver and gold brocades, and fine earthen ware. It is situated in a vast plain, 55 miles from Ispahan. E. Long. 50. 2. N. Lat. 34. 10.

CACHAO, a province of the kingdom of Tongquin in Asia, situated in the heart of the kingdom, and surrounded by the other seven. Its soil is fertile, and in some places mountainous, abounding with variety of trees, and particularly that of varnish. Most of these provinces carry on some branch of the silk manufacture, but this most of all. It takes its name from the capital, which is also the metropolis of the whole kingdom, though in other respects hardly comparable to a Chinese one of the third rank.

CACHAO, a city of the province of that name, in the kingdom of Tongquin in Asia, situated in E. Long. 105. 31. N. Lat. 22. 10. at about 80 leagues distance from the sea. It is prodigiously crowded with people, inasmuch that the streets are hardly passable, especially on market-days. These vast crowds, however, come mostly from the neighbouring villages; upon which account these villages have been allowed their halls in particular parts of the city, where they bring and dispose

pofo of their wares. The town itself, though the metropolis of the whole Tonquinese kingdom, hath neither walls nor fortifications. The principal streets are wider and airy, but the rest of them narrow and ill-paved; and, except the palace royal and arsenal, the town hath little else worth notice. The houses are low and mean, mostly built of wood and clay, and not above one story high. The magazines and warehouses belonging to foreigners are the only edifices built of brick; and which, though plain, yet, by reason of their height and more elegant structure, make a considerable show among those rows of wooden huts. From the combustibility of its edifices, this city suffers frequent and dreadful conflagrations. These spread with such surprising velocity, that some thousands of houses are often laid in ashes before the fire can be extinguished. To prevent these sad consequences, every house hath, either in its yard, or even in its centre, some low building of brick, in form of an oven, into which the inhabitants on the first alarm convey their most valuable goods. Besides this precaution, which every family takes to secure their goods, the government obliges them to keep a cistern, or some other capacious vessel, always full of water on the top of their house, to be ready on all occasions of this nature; as likewise a long pole and bucket, to throw water from the kennel upon the houses. If these two expedients fail of suppressing the flames, they immediately cut the straps which fasten the thatch to the walls, and let it fall in and waste itself on the ground. The king's palace stands in the centre of the city; and is surrounded with a stout wall, within whose circumference are seen a great number of apartments two stories high, whose fronts and portals have something of the grand taste. Those of the king and his wives are embellished with variety of carvings and gildings after the Indian manner, and all finely varnished. In the outer court are a vast number of sumptuous stables for the king's horses and elephants. The appearance of the inner courts can only be conjectured; for the avenues are not only shut to all strangers, but even to the king's subjects, except those of the privy council, and the chief ministers of state: yet we are told, that there are stair-cases by which people may mount up to the top of the walls, which are about 18 or 20 feet high; from whence they may have a distant view of the royal apartments, and of the fine parterres and fish-ponds that are between the circumference and them. The front wall hath a large gate well ornamented, which is never opened but when the king goes in and out; but at some distance from it on each side there are two posterns, at which the courtiers and servants may go in and out. This circumference, which is of a vast circumference, is faced with brick within and without, and the whole structure is terminated by wide spacious gardens; which, though stored with great variety of proper ornaments, are destitute of the grandeur and elegance observed in the palaces of European princes. — Besides this palace, the ruins of one still more magnificent are to be observed, and are called *Lihatvia*. The circumference is said to have been betwixt six and seven miles: some arches, porticoes, and other ornaments, are still remaining; from which, and some of its courts paved with marble, it may be concluded to have been as magnificent a structure as any of the eastern parts can shew. The arsenal is likewise a large

and noble building; well stored with ammunition and artillery. The English factory is situated on the north side of the city, fronting the river *Song-koy*. It is a handsome low-built house, with a spacious dining-room in the centre; and on each side are the apartments of the merchants, factors, and servants. At each end of the building are smaller houses for other uses, as store-houses, kitchen, &c. which form two wings with the square in the middle, and parallel with the river, near the bank of which stands a long flag-staff, on which they commonly display the English colours on Sundays and all remarkable days. Adjoining to it, on the south side, is the Danish factory, which is neither so large nor so handsome. On the same side of the river runs a long dike, whose timber and stones are so firmly fastened together, that no part of it can be stirred without moving the whole. This work was raised on those banks to prevent the river, during the time of their vault rains, from overflowing the city; and it has hitherto answered its end; for though the town stands high enough to be in no danger from land-floods, it might yet have been otherwise frequently damaged, if not totally laid under water, by the overflowing of that river. Some curious observations have been communicated to the royal society concerning differences between the tides of those seas and those of Europe, viz. that on the Tonquinese coast ebbs and flows but once in 24 hours; that is, that the tide is rising during the space of 12 hours, and can be easily perceived during two of the moon's quarters, but can hardly be observed during the other two. In the spring tides, which last 14 days, the waters begin to rise at the rising of the moon; whereas in the low tides, which continue the same number of days, the tide begins not till that planet is got below the horizon. Whilst it is passing through the six northern signs, the tides are observed to vary greatly, to rise sometimes very high, and sometimes to be very low; but when it is once got into the southern part of the zodiac, they are then found to be more even and regular.

CACHECTIC, something partaking of the nature of, or belonging to, a cachexy.

CACHEO, a town of Negroland in Africa, seated on the river St Domingo. It is subject to the Portuguese, who have three forts there, and carry on a great trade in wax and slaves. W. Long. 14. 55. N. Lat. 12. 0.

CACHEXY, in medicine, a vicious state of the humours and whole habit*.

CACHRYS, a genus of the pentandria order, belonging to the digynia class of plants. There are five species, viz. the trifida, with bipinnated leaves; the ficula, with double winged leaves; the libanotis, with smooth furrowed seeds; the linearia, with plain channelled fruit; and the hungarica, with a plain, funguous, channelled seed. All these are perennial plants, rising pretty high, and bearing large umbels of yellow flowers, and may be propagated by seeds which ought to be sown soon after they are ripe; for if they are kept out of the ground till the next spring, they often miscarry. They must also be sown in a shady border where they are to remain: for the plants, having long tap-roots, will not bear transplanting so well as many others. The Hungarians in the neighbourhood of Erlaw, and those who border on Transylvania, Servia,

* See (the Index joined to) Medicine.

Cacochylia, &c. eat the root of the fifth species in a scarcity of corn for want of other bread.

CACOCCHYLIA, or **CACOCHYMIA**, a vicious state of the vital humours, especially of the mafs of blood; arising either from a diforder of the fecretions or excretions, or from external contagion. The word is Greek, compounded of *κακός* ill, and *χυμός* juice.

CACTUS, **MELON-THISTLE**; a genus of the monogynia order, belonging to the icofandria clafs of plants. To this genus Linæus has added the *cereus* and *opuntia*; but to avoid the embarrassment occafioned by the defcription of fuch a variety of fpecies, we choofe, with Mr Miller, to defcribe them as three diftinct genera. See **CERES** and **OPUNTIA**.

Species. 1. The melocactus, with 14 angles, commonly called *great melon-thistle*. 2. The intortus, with 15 angles fpirally twifted, and erect fpires. 3. The recurvus, with 15 angles, having broad recurved fpires fet very clofe. 8. The mammillaris, clofely covered with bearded tubercles; or fmall American melon-thistle. 5. The proliferus, or fmall childing melon-thistle.

All the fpecies of this genus are plants of a fingular ftructure, but efpecially the larger kinds of them; which appear like a large, flefhy, green melon, with deep ribs, fet all over with ftrong fharp thorns; and, when the plants are cut through the middle, their infide is a foft, pale-green, flefhy fubftance, very full of moiſture. The fruit of all the fpecies is frequently eaten by the inhabitants of the Weſt Indies. The fruits are about three quarters of an inch in length, of a taper form, drawing to a point at the bottom toward the plant, but blunt at the top where the empalement of the flower was fited. The taſte is agreeably acid, which in a hot country muſt render the fruit more grateful.

Theſe ftrange plants commonly grow upon the fleep fides of rocks in the warmefſt parts of America, where they ſeem to be thruſt out of the apertures, having little or no earth to fupport them, their roots fhooting down into the fiſſures of the rock to a confiderable depth; fo that it is difficult to get the plants up, efpecially as they are fo ftrongly armed with thorns as to render it very dangerous to handle them. The large kinds were fome time ago brought over to England in much greater plenty than of late; but many of them were deſtroyed by the unkindneſs of thoſe perſons who had the care of them in the voyage: for, by giving them water, they generally cauſed them to rot before they were taken out of the ſhips; and ſome of thoſe which appeared to be found, were yet ſo replete with moiſture, that they rotted foon after they were placed in the ſtoves. Whoever therefore purpoſes to bring theſe plants from abroad, ſhould be very careful to take up their roots as entire as poſſible, and to plant them in tubs filled with ſtones and rubbiſh, having very little earth in it. Three or four plants alſo ought to be put into each tub, in proportion to their ſize, in order to ſave room; for they will not increaſe in bulk during their paſſage, and no room needs be allowed them for this purpoſe. There ſhould be ſeveral pretty large holes bored through the bottoms of theſe tubs, to let the moiſture paſs off; and if the plants are ſet in the tubs a month or more before they are put on ſhipboard, they will at that time have put forth new roots, which

will be the beſt method of making them ſucceed. All the time they remain in their natural country they ſhould have very little water given them, and after they are put on board they muſt have none at all. When they are brought to Britain, the larger forts require a very good ſtove to preferve them through the winter, nor ſhould they be expoſed to the air in ſummer; for although they may continue fair to outward appearance, yet when they have been for ſome time expoſed abroad, they will imbibe moiſture ſufficient to kill them on their readmiſſion to the ſtove, and this will happen very ſuddenly; ſcarce any appearance of diforder will be obſerved till the whole plant is killed, which in a few hours time has often been the fate of the plants when firſt placed in the ſtove. If theſe plants are plunged into a hot-bed of tanners bark in ſummer, it will greatly forward them in their growth: but when this is praſtiſed, there ſhould be ſcarce any water given to the plants; for the moiſture which they will imbibe from the fermentation of the tan will be ſufficient, and more would cauſe them rot. The beſt method to preferve all the large kinds is, in winter to place the pots either upon the top of the flues, or at leaſt very near them, that they may have the warmeſt place of the ſtove, and never to give them any water. The ſoil in which they are planted muſt be of a ſandy nature, and if mixed with ſome dry lime rubbiſh will be ſtill better. In the bottom of the pots ſhould be placed ſome ſtones, in order to drain off any moiſture that may be in the earth; for as theſe plants grow naturally upon the hot, dry, burning rocks, which have no earth, and were it not for theſe plants would be abſolutely barren, we muſt imitate their natural ſoil as near as poſſible, making ſome allowance for the difference of climates. The great forts may be propagated from feeds; but as the plants which are raiſed from feeds in this country will be ſome years in arriving at any conſiderable ſize, it will be much the beſt way to procure ſome plants from the Weſt Indies. The two ſmall forts propagate ſo faſt, the fourth by feeds, and the fifth from the young plants thruſt out from the fides of the old, that it is unneceſſary to ſend for any of them from abroad.

CACUS, in fabulous hiſtory, an Italian ſhepherd upon mount Aventine. As Hercules was driving home the herd of king Geryon whom he had ſlain, Cacus robbed him of ſome of his oxen, which he drew backward into his den leſt they ſhould be diſcovered. Hercules at laſt finding them out by their lowing, or the robbery being diſcovered to him, killed Cacus with his club. He was Vulcan's ſon, of prodigious bulk, and half man half ſatyur.

CADAN, a town of Bohemia, in the circle of Zats, ſeated on the northern bank of the river Egra, in E. Long. 13. 34. N. Lat. 50. 20.

CADE, a cag, calk, or barrel. A cade of herrings is a veſſel containing the quantity of 500 red herrings, or 1000 ſprats.

CADE-Worm, in zoology, the maggot or worm of a fly called *phryganea*. It is uſed as a bait in angling.

CADEA, or **THE LEAGUE OF THE HOUSE OF GOD**, is one of thoſe that compoſe the republic of the Griſons, and the moſt powerful and extenſive of them all. It contains the biſhopric of Coire, the great valley of Engadine, and that of Bragail or Fregal. Of the 11 great, or 21 ſmall communities, there are but two that ſpeak

Cadenac
||
Cadi.

speak the German language; that of the rest is called the *Rhetie*, and is a dialect of the Italian. The Protestant religion is most prevalent in this league, which has been allied to the Swiss cantons ever since the year 1498. Coire is the capital town.

CADENAC, a town of France in Querci, on the confines of Rouergue, seated on the river Lot, in E. Long. 2. 12. N. Lat. 44. 36.

CADENCE, or REPOSE, in music, (from the Latin *cadere* to fall or descend); the termination of an harmonical phrase on a repose, or on a perfect chord *.

CADENCE, in reading, is a falling of the voice below the key-note at the close of every period. In reading, whether prose or verse, a certain tone is assumed which is called the *key-note*; and in this tone the bulk of the words are founded; but this note is generally lowered towards the close of every sentence.

CADENCE, in the menage, an equal measure or proportion, observed by a horse in all his motions; so that his times have an equal regard to one another, the one does not embrace or take in more ground than the other, and the horse observes his ground regularly.

CADENE, one of the sorts of carpets which the Europeans import from the Levant. They are the worst sort of all, and are sold by the piece from one to two piasres per carpet.

CADENET, a town of France in Provence, and in the Vigueirie of Apt. E. Long. 5. 30. N. Lat. 43. 40.

CADET, the younger son of a family, is a term naturalized in our language from the French. At Paris, among the citizens, the cadets have an equal patrimony with the rest. At Caen, in Normandy, the custom, as with us, is to leave all to the eldest, except a small portion to the cadets. In Spain, it is usual for one of the cadets in great families to take the mother's name.

CADET is also a military term denoting a young gentleman who chuses to carry arms in a marching regiment as a private man. His views are, to acquire some knowledge in the art of war, and to obtain a commission in the army. Cadet differs from volunteer, as the former takes pay, whereas the latter serves without pay.

CADI, or CADHI, a judge of the civil affairs in the Turkish empire. It is generally taken for the judge of a town; judges of provinces being distinguished by the appellation of *mollas*.

We find numerous complaints of the avarice, iniquity, and extortion, of the Turkish cadis: all justice is here venal; the people bribe the cadis, the cadis bribe the *moulas*, the *moulas* the *cadilefchers*, and the *cadilefchers* the *moufti*. Each *cadi* has his serjeants, who are to summon persons to appear and answer complaints. If the party summoned fails to appear at the hour appointed, sentence is passed in favour of his adversary. It is usually vain to appeal from the sentences of the *cadi*, since the affair is never heard anew, but judgment is passed on the case as stated by the *cadi*. But the *cadis* are often cashiered and punished for crying in justice with the *bastinado* and *mulfes*; the law, however, does not allow them to be put to death. Constantinople has had *cadis* ever since the year 1390, when Bajazet I. obliged John Palæologus, emperor of the

Cadilefcher
||
Cadmus.

Greeks, to receive *cadis* into the city to judge all controversies happening between the Greeks and the Turks settled there. In some countries of Africa, the *cadis* are also judges of religious matters. Among the Moors, *cadis* is the denomination of their higher order of priests or doctors, answering to the rabbins among the Jews.

CADILESCHER, a capital officer of justice among the Turks, answering to a chief justice among us.

It is said, that this authority was originally confined to the soldiery; but that, at present, it extends itself to the determination of all kinds of law-suits; yet is nevertheless subject to appeals.

There are but three *cadilefchers* in all the grand signior's territories: the first is that of Europe; the second, of Natolia; and the third resides at Grand Cairo. This last is the most considerable: they have their seats in the divan next to the grand vizir.

CADILLAC, a town of France in Guienne, and in Bazadois, near the river Garonne, with a handsome castle, situated in W. Long. o. 15. N. Lat. 44. 37.

CADIZ, a city and port-town of Andalusia in Spain, situated on the north-west end of the island of Leon, or Lyon, opposite to Port St Mary on the continent, about 60 miles south-west of Seville, and 40 north-west of Gibraltar. W. Long. 6. 40. N. Lat. 36. 30.

The island it stands on is in length about 18 miles: the south-west end is about nine broad; but the other end, where the city stands, not above two. It has a communication with the continent by means of a bridge; and, with the opposite shore, forms a bay of 12 miles long and six broad. About the middle of this bay, there are two head-lands, or promontories, one on the continent, and the other on the island, which advance so near together, that the forts upon them, called the *Puntal* and *Matagorda*, command the passage; and within these forts is the harbour, which it is impossible for an enemy to enter till he has first taken the forts. This port is the station of the American fleet, and is always well furnished with other ships. There were formerly two wonderful springs at Cadiz, but they are now lost, as well as some Phœnician antiquities, as the temple of Hercules, and two brazen pillars, &c. There was likewise a small island in the bay, where the inhabitants had houses of pleasure; but it is now swallowed up. In 1596, Cadiz was taken, pillaged, and burnt, by the English; but in 1702 it was attempted in conjunction with the Dutch, without success.

CADIZADELITES, a sect of Mahometans very like the ancient stoics. They shun feasts and diversions, and affect an extraordinary gravity in all their actions; they are continually talking of God, and some of them make a jumble of Christianity and Mahometanism; they drink wine, even in the fast of the *ramazan*; they love and protect the Christians; they believe that Mahomet is the Holy Ghost, practise circumcision, and justify it by the example of Jesus Christ.

CADMIA. See CALAMINE.

CADMUS, in fabulous history, king of Thebes, the son of Agenor king of Phœnicia, and the brother of Phœnix, Cilix, and Europa. He carried into Greece the 16 simple letters of the Greek alphabet; and there built Thebes, in Bœotia. The poets say, that he left his native country in search of his sister Europa, whom Jupiter had carried away in the form of a bull; and that, inquiring

* See *Musici*,
art. 73—76,
and 732—
737.

Cadmus
||
Caduceus.

Caduci
||
Caen.

inquiring of the Delphic oracle for a settlement, he was answered, that he should follow the direction of a cow, and build a city where she lay down. Having arrived among the Phœnices, he was met by a cow, who conducted him through Boeotia to the place where Thebes was afterwards built: but as he was about to sacrifice his guide to Pallas, he sent two of his company to the fountain Dirce for water; when they being devoured by a serpent or dragon, he slew the monster, and afterwards, by the advice of Pallas, sowed his teeth, when there sprung up a number of armed soldiers, who prepared to revenge the death of the serpent; but on his casting a stone among these upstart warriors, they turned their weapons against each other with such animosity, that only five survived the combat, and these assisted Cadmus in founding his new city. Afterwards, to recompence his labours, the Gods gave him Harmonia, or Hermione, the daughter of Mars and Venus; and honoured his nuptials with presents and peculiar marks of favour. But at length resigning Thebes to Pentheus, Cadmus and Hermione went to govern the Eccleclenses: when grown old, they were transformed into serpents; or, as others say, sent to the Elysian fields, in a chariot drawn by serpents. See THEBES.

CADMUS of Miletum, a celebrated Greek historian, was, according to Pliny, the first of the Greeks who wrote history in prose. He flourished about 550 before Christ.

CADORE, or PIEVE DE CADORE, a town of Italy, in the territory of Venice, and capital of a district called *Cadorino*; famous for the birth of Titian the painter. E. Long. 13. 45. N. Lat. 46. 25.

CADORINO, a province of Italy, in the territory of Venice; bounded on the east by Friuli Proper, on the south and west by the Bellunese, and by the bishopric of Brixen on the north. It is a very mountainous country, but pretty populous. The only town is Pieve de Cadore.

CADRITES, a sort of Mahometan friars, who once a-week spend a great part of the night in turning round, holding each others hand, and repeating incessantly the word *hai*, which signifies *living*, and is one of the attributes of God; during which one of them plays on a flute. They never cut their hair, nor cover their heads; and always go barefooted: they have liberty to quit their convent when they please, and to marry.

CADSAND, an island on the coast of Dutch Flanders, situated at the mouth of the Scheld, whereby the Dutch command the navigation of that river.

CADUCEUS, in antiquity, Mercury's rod or sceptre, being a wand entwined by two serpents borne by that deity as the ensign of his quality and office, given him, according to the fable by Apollo, for his seven-stringed harp. Wonderful properties are ascribed to this rod by the poets; as laying men asleep, raising the dead, &c.

It was also used by the ancients as a symbol of peace and concord: the Romans sent the Carthaginians a javelin and a caduceus, offering them their choice either of war or peace. Among that people, those who denounced war were called *feciales*; and those who went to demand peace, *caducatores*, because they bore a caduceus in their hand.

The caduceus found on medals is a common symbol,

signifying good conduct, peace, and prosperity. The rod expresses power, the two serpents prudence, and the two wings diligence.

CADUCI, (from *cado* to fall); the name of a class in Linnæus's *calycina*, consisting of plants whose calix is a simple perianthium, supporting a single flower or fructification, and falling off either before or with the petals. It stands opposed to the *classis persistentes* in the same method, and is exemplified in mustard and ranunculus.

CADURCI, CADURCUM, *Cadurcus*, and *Cadurx*, (anc. geog.), a town of the Cadurci a people of Aquitania; situated between the rivers Oldus running from the north, and the Tarnis from the south, and falling into the Garumna: now *Cabors*, capital of the territory of the Querci, in Guienne†. A part of the Cadurci, to the south next the Tarnis, were called *E-leutheri*. † See Cadurci.

CADUSII (anc. geog.), a people of Media Atropatene, situated to the west in the mountains, and reaching to the Caspian sea; between whom and the Medes, perpetual war and enmity continued down to the time of Cyrus.

CADUS, in antiquity, a wine-vessel of a certain capacity, containing 80 amphoræ or firkins; each of which, according to the best accounts, held nine gallons.

CÆCILIA, in zoology, a genus of serpents belonging to the amphibia class. The cæcilia has no scales; it is smooth, and moves by means of lateral rugæ or prickles. The upper lip is prominent, and furnished with two tentacula. It has no tail. There are but two species of this serpent, *viz.* 1. The tentaculata, has 135 rugæ. It is about a foot long, and an inch in circumference, preserving an uniform cylindrical shape from the one end to the other. The teeth are very small. It has such a resemblance to an eel, that it may easily be mistaken for one; but as it has neither fins nor gills, it cannot be classed with the fishes. It is a native of America, and its bite is not poisonous. 2. The glutinosa, has 340 rugæ or prickles above, and 10 below, the anus. It is of a brownish colour, with a white line on the side, and is a native of the Indies.

CÆCUM, or Cœcum, the blind gut*.

CÆLIUS (Aurelianus), an ancient physician, and the only one of the sect of the methodists of whom we have any remains. He was of Sicca, a town of Numidia; but in what age he lived, cannot be determined: it is probable, however, that he lived before Galen; since, though he carefully mentions all the physicians before him, he takes no notice of Galen. He had read over very diligently the ancient physicians of all sects; and we are indebted to him for the knowledge of many dogmas which are not to be found but in his books *de celeribus et tardis passionibus*. He wrote, as he himself tells us, several other works; but they are all perished.

CÆMENT. See CEMENT.

CÆMENTATION. See CEMENTATION.

CAEN; an handsome and considerable town of France, capital of lower Normandy, with a celebrated university, and an academy of literature. It contains 60 streets, and 12 parishes. It has a castle with four towers, which were built by the English. The town-house is a large building with four great towers. The royal

* See Anatomia, n° 354, h.

Cære
|| Caernar-
then.

royal square is the handfastest in all Normandy, and has fine houses on three sides of it; and in the middle is the statue of Lewis XIV. in a Roman habit, standing on a marble pedestal, and surrounded with an iron ballustrade. It is seated in a pleasant country on the river Orne, about eight miles from the sea. William the conqueror was buried here, in the abbey of St Stephen which he founded. W. Long. o. 27. N. Lat. 49. 11.

CÆRL, (anc. geog.), a town of Etruria, the royal residence of Mezentius. Its ancient name was *Argyllæ*. In Strabo's time not the least vestige of it remained, except the baths called *cærcana*. From this town the Roman censor's tables were called *cærites tabulæ*. In these were entered the names of such as for some misdemeanor forfeited their right of suffrage, or were degraded from a higher to a less honourable tribe. For the people of Cære hospitably receiving those Romans who, after the taking of Rome by the Gauls, fled with their gods and the sacred fire of Vesta, were, on the Romans recovering themselves from this disaster, honoured with the privilege of the city, but without a right of voting.

CÆRITES TABULÆ. See the preceding article.

CAERFILLY, a town of Glamorganshire in South Wales, seated between the rivers Taif and Rumney, in a moorish ground, among the hills. It is thought the walls, now in ruins, were built by the Romans; there being often Roman coins dug up there. W. Long. 3. 12. N. Lat. 51. 35.

CAERLEON, a town of Monmouthshire in England, and a place of great antiquity. It was a Roman town, as is evident from the many Roman antiquities found here. It is commodiously situated on the river Uik, over which there is a large wooden bridge. The houses are generally built of stone, and there are the ruins of a castle still to be seen. W. Long. 3. o. N. Lat. 51. 40.

CAERMARTHEN-SHIRE, a county of Wales, bounded on the north by Severn sea or St George's channel, Cardiganshire on the south, the shires of Brecknock and Glamorgan on the east, and Pembroke-shire on the west. Its greatest length is between 30 and 40 miles, and its breadth upwards of 20. The air is wholesome, and the soil less rocky and mountainous than most other parts of Wales, and consequently is proportionally more fertile both in corn and pasture. It has also plenty of wood, and is well supplied with coal and limestone. The most considerable rivers are the Towy, the Cothy, and the Tave; of which, the first abounds with excellent salmon. The principal towns are Caermarthen the capital, Kidwely, Lanidovercy, &c. This county abounds with ancient forts, camps, and tumuli or barrows. Near to Caermarthen, towards the east, may be seen the ruins of Kaflek Karrey, which was situated on a steep and inaccessible rock; and also several vast caverns, supposed to have been copper-mines of the Romans. Near this spot is a fountain which ebbs and flows twice in 24 hours like the sea.

CAERMARTHEN, a town of Wales, and capital of the county of that name. It is situated on the river Fowey, over which it has a fine stone-bridge. It is of great antiquity, being the Maridunum of Ptolemy. It is a populous, thriving, and polite place, many of the

neighbouring gentry residing there in the winter. It is a corporation and county of itself, with power to make by-laws. Here were held the courts of chancery and exchequer for South Wales, till the whole was united to England in the reign of Henry VIII. Here was born the famous conjurer Merlin; and near the town is a wood called *Merlin's grove*, where he is said to have often retired for contemplation. Many of his pretended prophecies are still preserved in the country. The town gives the title of *marquis* to his grace the duke of Leeds. This town sends one member to parliament, and the county another.

CAERNARVON-SHIRE, a county of Wales, bounded on the north and west by the sea, on the south by Merionethshire, and on the east is divided from Denbighshire by the river Conway. It is about 40 miles in length, and 20 in breadth; and sends one member to parliament for the shire, and another for the borough of Caernarvon. The air is very piercing; owing partly to the snow, that lies seven or eight months of the year upon some of the mountains, which are so high that they are called the *British Alps*; and partly to the great number of lakes, which are said not to be fewer than 50 or 60. The soil in the valleys on the side next Ireland is pretty fertile, especially in barley; great numbers of black cattle, sheep, and goats, are fed on the mountains; and the sea, lakes, and rivers, abound with variety of fish. The highest mountains in the county are those called *Snowdon hills*, and *Pen-maen-mawr*, which last hangs over the sea. There is a road cut out of the rock on the side next the sea, guarded by a wall running along the edge of it on that side; but the traveller is sometimes in danger of being crushed by the fall of pieces of the rock from the precipices above. The river Conway, though its course from the lake out of which it issues to its mouth is only 12 miles, yet is so deep, in consequence of the many brooks it receives, that it is navigable by ships of good burden for eight miles. Pearls are found in a large black muscle taken in this river. The principal towns are Bangor, Caernarvon the capital, and Conway. In this county is an ancient road said to have been made by Helena the mother of Constantine the Great; and Matthew of Westminster asserts, that the body of Constantine the father of the same Constantine was found at Caernarvon in the year 1283, and interred in the parish-church there by order of Edward I.

CAERNARVON, a town of Wales, and capital of the county of that name. It was built by Edward I. near the site of the ancient Segontium. It is almost surrounded by the sea and two rivers; gives name to the neighbouring bay; and had anciently a castle, built also by Edward I. in which his son Edward II. was born. It is a small neat town, governed by a constable of the castle who is also mayor, an alderman, two bailiffs, a town-clerk, and other inferior officers. The market is well supplied with provisions, and there is a ferry from hence to Anglesey. The town gives title of *earl* and *marquis* to the duke of Chandos, and has a good tide-harbour.

CAERWIS, a market-town of Flintshire in North Wales, situated in W. Long. 3. 25. N. Lat. 53. 20.

CÆSALPINA, BRASILETTO, or *Brasile-wood*, a genus of the monogymia order, belonging to the decandria class of plants. Of this there are two species.

1. The

Caernarvon-
shire
|| Cæsalpina.

Cæsalpina
Cæsar.

Plate
I. XVII.
fig. 2.

* See Colour-
Making,
and Dyeing.

1. The brasiliensis, commonly called *brasiletto*. 2. The cæsalpina, with small oval and entire leaves.—The first grows naturally in the warmest parts of America, from whence the wood is imported for the dyers, who use it much. The demand has been so great, that none of the large trees are left in any of the British plantations; so that Mr Catesby owns himself ignorant of the dimensions to which they grow. The largest remaining are not above two inches in thickness, and eight or nine feet in height. The branches are slender and full of small prickles; the leaves are pinnated; the lobes growing opposite to one another, broad at their ends, with one notch. The flowers are white, papilionaceous, with many stamina and yellow apices, growing in a pyramidal spike, at the end of a long slender stalk: the pods inclose several small round seeds. The colour produced from this wood is greatly improved by solution of tin in aqua regia *.—The second sort is a native of the same countries with the first, but is of a larger size. It sends out many weak irregular branches, armed with short, strong, upright thorns. The leaves branch out in the same manner as the first; but the lobes, or small leaves, are oval and entire. The flowers are produced in long spikes like those of the former, but are variegated with red. These plants may be propagated from seeds, which should be sown in small pots filled with light rich earth early in the spring, and plunged in a bed of tanner's bark. Being tender, they require to be always kept in the stove, and to be treated in the same manner as other exotics of that kind.

CÆSALPINUS of Arezzo, professor at Pisa, and afterwards physician to pope Clement VIII. one of the capital writers in botany. See BOTANY, p. 1284, 1286.

CÆSAR (Julius), the illustrious Roman general and historian, was of the family of the Julii, who pretended they were descended from Venus by Æneas. The descendants of Æscenius son of Æneas and Creusa, and surnamed *Julius*, lived at Alba till that city was ruined by Tullus Hostilius king of Rome, who carried them to Rome, where they flourished. We do not find that they produced more than two branches. The first bore the name of *Tullus*, the other that of *Cæsar*. The most ancient of the Cæsars were those who were in public employments in the 11th year of the first Punic war. After that time we find there was always some of that family who enjoyed public offices in the commonwealth, till the time of Caius Julius Cæsar, the subject of this article. He was born at Rome the 12th of the month Quintilis, year of the city 653, and lost his father an. 669. By his valour and eloquence he soon acquired the highest reputation in the field and in the senate. Beloved and respected by his fellow-citizens, he enjoyed successively every magisterial and military honour the republic could bestow consistent with its own free constitution. But at length having subdued Pompey the great rival of his growing power, his boundless ambition effaced the glory of his former actions: for, pursuing his favourite maxim, "that he had rather be the first man in a village than the second in Rome," he procured himself to be chosen perpetual dictator; and, not content with this unconstitutional power, his faction had resolved to raise him to the imperial dignity; when the friends of the civil liberties of the republic rashly assassinated him in the senate-house, where they should only have seized him and

brought him to a legal trial for usurpation. By this impolitic measure they defeated their own purpose, involving the city in consternation and terror, which produced general anarchy, and paved the way to the revolution they wanted to prevent; the monarchical government being absolutely founded on the murder of Julius Cæsar. He fell in the 56th year of his age, 43 years before the Christian æra. His commentaries contain a history of his principal voyages, battles, and victories. The London edition in 1712, in folio, is preferred.

The detail of Cæsar's transactions (so far as is consistent with the limits of this work) being given under the article ROME, we shall here only add a portrait of him as drawn by a philosopher *.

"If after the lapse of 18 centuries, the truth may be published without offence, a philosopher might, in the following terms, censure Cæsar without calumniating him, and applaud him without exciting his blushes.

"Cæsar had one predominant passion: it was the love of glory; and he passed 40 years of his life in seeking opportunities to foster and encourage it. His soul, entirely absorbed in ambition, did not open itself to other impulses. He cultivated letters; but he did not love them with enthusiasm, because he had not leisure to become the first orator of Rome. He corrupted the one half of the Roman ladies, but his heart had no concern in the fiery ardours of his senses. In the arms of Cleopatra, he thought of Pompey; and this singular man, who disdained to have a partner in the empire of the world, would have blushed to have been for one instant the slave of a woman.

"We must not imagine, that Cæsar was born a warrior, as Sophocles and Milton were born poets. For, if nature had made him a citizen of Sybaris, he would have been the most voluptuous of men. If in our days he had been born in Pennsylvania, he would have been the most inoffensive of quakers, and would not have disturbed the tranquillity of the new world.

"The moderation with which he conducted himself after his victories, has been highly extolled; but in this he shewed his penetration, not the goodness of his heart. Is it not obvious, that the display of certain virtues is necessary to put in motion the political machine? It was requisite that he should have the appearance of clemency, if he inclined that Rome should forgive him his victories. But what greatness of mind is there in a generosity which follows on the usurpation of supreme power?

"Nature, while it marked Cæsar with a sublime character, gave him also that spirit of perseverance which renders it useful. He had no sooner begun to reflect, than he admired Sylla; hated him, and yet wished to imitate him. At the age of 15, he formed the project of being dictator. It was thus, that the president Montesquieu conceived, in his early youth, the idea of the spirit of laws.

"Physical qualities, as well as moral causes, contributed to give strength to his character. Nature, which had made him for command, had given him an air of dignity. He had acquired that soft and insinuating eloquence, which is perfectly suited to seduce vulgar minds, and has a powerful influence on the most cultivated. His love of pleasure was a merit with the fair

sex;

Cæsar.

* From the
Mélanges
Philosophiques of
M. Ophel-
lot.

Fig. 1. CACAO, or
Chocolate-*Nut Tree*.

Fig. 2. CESALPINIA *Braziliensis*
or *Brazil*-*wood Tree*.



Fig. 4. CANCER *Strigatus*
or *Plate*-*lobster*.

Fig. 3. CANCER *Hermitus*
or *Hermit*-*Crab*.

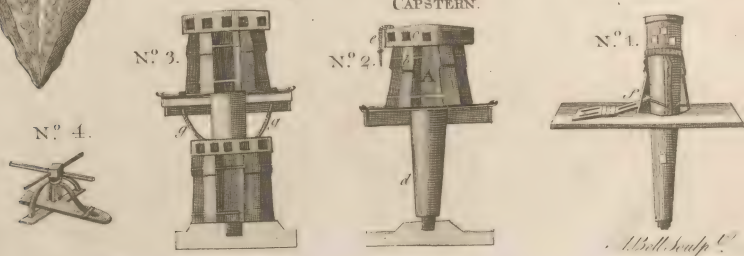
Fig. 5.
CAPSTERN.

N^o 3.

N^o 2.

N^o 1.

N^o 4.



W. Bell. Sculp.

Cæsar. sex; and women, who even in a republic can draw to them the suffrages and attention of men, have the highest importance in degenerate times. The ladies of his age, were charmed with the prospect of having a dictator whom they might subdue by their attractions.

"In vain did the genius of Cato watch for some time to sustain the liberty of his country. It was unequal to contend with that of Cæsar. Of what avail were the eloquence, the philosophy, and the virtue of this republican, when opposed by a man, who had the address to debauch the wife of every citizen whose interest he meant to engage; who, possessing an enthusiasm for glory, wept, because, at the age of 30, he had not conquered the world like Alexander; and who, with the haughty temper of a despot, was more desirous to be the first man in a village, than the second in Rome.

"Cæsar had the good fortune to exist in times of trouble and civil commotions, when the minds of men are put into a ferment; when opportunities of great actions are frequent; when talents are every thing, and those who can only boast of their virtues are nothing. If he had lived an hundred years sooner, he would have been no more than an obscure villain, and, instead of giving laws to the world, would not have been able to produce any confusion in it.

"I will here be bold enough to advance an idea, which may appear paradoxical to those who weakly judge of men from what they achieve, and not from the principle which leads them to act. Nature formed, in the same mould, Cæsar, Mahomet, Cromwell, and Kouli Khan. They all of them united to genius that profound policy which renders it so powerful. They all of them had an evident superiority over those with whom they were surrounded; they were conscious of this superiority, and they made others conscious of it. They were all of them born subjects, and became fortunate usurpers. Had Cæsar been placed in Persia, he would have made the conquest of India; in Arabia, he would have been the founder of a new religion; in London, he would have stabbed his sovereign, or have procured his assassination under the sanction of the laws. He reigned with glory over men whom he had reduced to be slaves; and, under one aspect, he is to be considered as a hero; under another, as a monster. But it would be unfortunate, indeed, for society, if the possession of superior talents gave individuals a right to trouble its repose. Usurpers accordingly have flattered, but no friends; strangers respect them; their subjects complain and submit; it is in their own families that humanity finds her avengers. Cæsar was assassinated by his son, Mahomet was poisoned by his wife, Kouli Khan was massacred by his nephew, and Cromwell only died in his bed because his son Richard was a philosopher.

"Cæsar, the tyrant of his country; Cæsar, who destroyed the agents of his crimes, if they failed in address; Cæsar, in fine, the husband of every wife, and the wife of every husband; has been accounted a great man by the mob of writers. But it is only the philosopher, who knows how to mark the barrier between celebrity and greatness. The talents of this singular man, and the good fortune which constantly attended him till the moment of his assassination, have concealed the enormity of his actions."

CÆSAR, in Roman antiquity, a title borne by all

the emperors, from Julius Cæsar, to the destruction of the empire. It was also used as a title of distinction for the intended or presumptive heir of the empire, as *king of the Romans* is now used for that of the German empire.

This title took its rise from the surname of the first emperor, C. Julius Cæsar, which, by a decree of the senate, all the succeeding emperors were to bear. Under his successor, the appellation of *Augustus* being appropriated to the emperors, in compliment to that prince, the title *Cæsar* was given to the second person in the empire, though still it continued to be given to the first; and hence the difference betwixt Cæsar used simply, and Cæsar with the addition of Imperator Augustus.

The dignity of Cæsar remained the second of the empire, till Alexius Comnenus having elected Nicephorus Melissenus Cæsar, by contract; and it being necessary to confer some higher dignity on his own brother Isaacius, he created him Sebastocrator, with the precedence over Melissenus; ordering, that in all acclamations, &c. Isaacius Sebastocrator should be named the second, and Melissenus Cæsar the third.

CÆSAR (Sir Julius), a learned civilian, was descended by the female line from the duke de Cesarini in Italy; and was born near Tottenham in Middlesex, in the year 1557. He was educated at Oxford, and afterwards studied in the university of Paris, where, in the year 1581, he was created doctor of the civil law, and two years after was admitted to the same degree at Oxford, and also became doctor of the canon law. He was advanced to many honourable employments, and for the last 20 years of his life was master of the rolls. He was remarkable for his extensive bounty and charity to all persons of worth, so that he seemed to be the almoner-general of the nation. He died 1639, in the 79th year of his age. It is very remarkable that the manuscripts of this lawyer were offered (by the executors of some of his descendants) to a cheefemonger for waste-paper; but being timely inspected by Mr Samuel Paterfon, this gentleman discovered their worth, and had the satisfaction to find his judgement confirmed by the profession, to whom they were sold in lots for upwards of 500 l. in the year 1757.

CÆSAR *Augusta*, or *Cæsarea Augusta*, (anc. geog.), a Roman colony situated on the river Iberus in the hither Spain, before called *Saluba*, in the territories of the Edetani. Now commonly thought to be *Saragosa*. See that article.

CÆSAREA, the name of several ancient cities, particularly one on the coast of Phenice. It was very conveniently situated for trade; but had a very dangerous harbour, so that no ships could be safe in it when the wind was at south-west. Herod the Great king of Judea remedied this inconveniency at an immense expence and labour, making it one of the most convenient havens on that coast. He also beautified it with many buildings, and bestowed 12 years in the finishing and adorning it.

CÆSARIAN operation, in midwifery. See MIDWIFERY, chap. vi.

CÆSARIANS, *Cæsarienses*, in Roman antiquity, were officers or ministers of the Roman emperors: They kept the account of the revenues of the emperors; and took possession, in their name, of such things as de-

Cæsarodunum
||
Cassa.

Cassila
||
Cagayan.

involved or were confiscated to them.

CÆSARODUNUM (anc. geog.), a town of the Turones in Celtic Gaul; now *Tours*, the capital of Touraine. See *Tours*.

CÆSAROMAGUS (anc. geog.), a town of the Trinobantes in Britain; by some supposed to be *Chelmsford*, by others *Brentford*, and by others *Burset*.

CÆSENA (anc. geog.), a town of Gallia Cispadana, situated on the rivers *Isapis* and *Rubicon*; now *Cesena*, which see.

CÆSIA SYLVA (anc. geog.), a wood in Germany, part of the great *Sylva Hercynia*, situated partly in the duchy of Cleves, and partly in Westphalia between *Wesel* and *Kesfield*.

CÆSONES, a denomination given to those cut out of their mother's womb. Pliny ranks this as an auspicious kind of birth; the elder *Scipio Africanus*, and the first family of *Cæsars*, were brought into the world in this way.

CÆSTUS, in antiquity, a large gantlet made of raw hide, which the wrestlers made use of when they fought at the public games.—This was a kind of leathern strap, strengthened with lead, or plates of iron, which encompassed the hand, the wrist, and a part of the arm, as well to defend these parts, as to enforce their blows.

CÆSTUS, or *Cæstum*, was also a kind of girdle, made of wool, which the husband untied for his spouse the first day of marriage, before they went to bed.

This relates to *Venus's* girdle, which *Juno* borrowed of her to entice *Jupiter* to love her. See *Cæstus*.

CÆSURA, in the ancient poetry, is when, in the scanning of a verse, a word is divided so, as one part seest cut off, and goes to a different foot from the rest; as,

Mentis ri noli, nunquam men[da]cia profunt.

where the syllables *ri*, *li*, *quam*, and *men*, are *cæsuras*.

CÆSURE, in the modern poetry, denotes a rest, or pause, towards the middle of an *Alexandrian* verse, by which the voice and pronunciation are aided, and the

† See *Parfe*, verse, as it were, divided into two hemistichs †.

CÆTERIS PARIBUS, a Latin term in frequent use among mathematical and physical writers. The words literally signify, *the rest* (or other things) being alike or equal. Thus we say, the heavier the bullet, *cæteris paribus*, the greater the range; i. e. by how much the bullet is heavier, if the length and diameter of the piece and strength of the powder be the same, by so much will the utmost range or distance of a piece of ordnance be the greater. Thus also, in a physical way, we say, the velocity and quantity circulating in a given time through any section of an artery, will, *cæteris paribus*, be according to its diameter, and nearness to or distance from the heart.

CÆTOBRIX (anc. geog.), a town of Lusitania, near the mouth of the *Tagus* on the east tide; now extinct. It had its name from its fishery; and there are still extant fish-ponds on the shore, done with plaster of Paris, which illustrate the name of the ruined city.

CAFFA, in commerce, painted cotton-cloths manufactured in the East Indies, and sold at Bengal.

CAFFA, or *Kassa*, a city and port-town of Crim Tartary, situated on the south-east part of that peninsula. E. Long. 37. o. N. Lat. 44. 55.

It is the most considerable town in the country, and gives name to the straits of *Cassa*, which run from the *Euxine* or *Black Sea*, to the *Palus Meotis*, or sea of *Azoph*.

CAFFILA, a company of merchants or travellers, who join together in order to go with more security through the dominions of the *Grand Mogul*, and through other countries on the continent of the East Indies.

The *Caffila* differs from a caravan, at least in *Perfia*: for the *cassila* belongs properly to some sovereign, or to some powerful company in Europe; whereas a caravan is a company of particular merchants, each trading upon his own account. The English and Dutch have each of them their *cassila* at *Gambrow*. There are also such *cassilas*, which cross some parts of the deserts of Africa, particularly that called the *sea of sand*, which lies between the kingdom of Morocco, and those of *Tombut* and *Gaigo*. This is a journey of 400 leagues; and takes up two months in going, and as many in coming back; the *cassila* travelling only by night, on account of the excessive heat of that country. The chief merchandize they bring back consists in gold dust, which they call *atibar*, and the Europeans *tibir*.

CAFFILA on the coast of *Guzerat* or *Cambaya*, signifies a small fleet of merchant-ships.

CAFFRARIA, the country of the *Cassers*, or *Hot-tentents*, in the most southerly part of Africa, lying in the form of a crescent about the inland country of *Monomopata*, between 35° south latitude and the tropic of *Capricorn*; and bounded on the east, south, and west, by the Indian and Atlantic oceans.

Most of the sea-coasts of this country are subject to the Dutch, who have built a fort near the most southern promontory, called the *Cape of Good-Hope* *.

* See *Hutchinson*.

CAG, or *KEG*, a barrel or vessel, that contains from four to five gallons.

CAGE, an inclosure made of wire, wicker, or the like, interwoven lattice-wise, for the confinement of birds, or wild beasts.

The cage, in the Roman amphitheatres, was a place wherein savage animals were confined. It was inclosed with iron rails, and open at top, so as to be seen to the bottom by the spectators.

CAGEAN, or *CAGAYAN*, a province of the island of *Lutzen*, or *Manila*, in the East Indies. It is the largest in the island, being 80 leagues in length, and 40 in breadth. The principal city is called *New Segovia*, and 15 leagues eastward from this city lies *cape Bajador*. Doubling that cape, and coasting along 20 leagues from north to south, the province of *Cagayan* ends, and that of *Illocos* begins. The peaceable *Cagayans* who pay tribute are about 9000; but there are a great many not subdued. The whole province is fruitful: the men apply themselves to agriculture, and are of a martial disposition; and the women apply to several works in cotton. The mountains afford food for a vast number of bees; in consequence of which wax is so plenty, that all the poor burn it instead of oil. They make their candles after the following manner: they leave a small hole at each end of a hollow stick for the wick to run through; and then, stopping the bottom, fill it with wax at the top: when cold, they break the mould, and take out the candle. On the mountains there is abundance of brass, ebony, and other

ther valuable woods. In the woods are store of wild bealts, as boars; but not so good as those of Europe. There are also abundance of deer, which they kill for their skins and horns to sell to the Chinese.

CAGLI, an ancient episcopal town of Italy, in the duchy of Urbino, situated at the foot of the Apennine mountains. E. Long. 14. 12. N. Lat. 43. 30.

CAGLIARI (Paul), an excellent painter, born at Verona in the year 1532. Gabriel Cagliari his father was a sculptor, and Antonio Badile his uncle was his master in painting. He was not only esteemed the best of all the Lombard painters, but for his extensive talents in the art was peculiarly styled *Il pittor felice*, "the happy painter;" and there is scarcely a church in Venice where some of his performances are not to be seen. He died of a fever at Venice in 1588, and had a tomb and a statue of brass erected to his memory in the church of St Sebastian. He left great wealth to his two sons Gabriel and Charles, who lived happily together, and joined in finishing several of their father's imperfect pieces with good success.

CAGLIARI, an ancient, large, and rich town, capital of the island of Sardinia in the Mediterranean. It is seated on the declivity of an hill, is an university, an archbishopric, and the residence of the viceroy. It has an excellent harbour, and a good trade; but is a place of no great strength. It was taken, with the whole island, by the English in 1708, who transferred it to the emperor Charles VI.; but it was retaken by the Spaniards in 1717, and about two years afterwards ceded to the duke of Savoy in lieu of Sicily, and hence he has the title of *king of Sardinia*. E. Long. 9. 14. N. Lat. 39. 12.

CAGUI, in zoology, a synonyme of two species of monkeys, viz. the jactus, and ædipus. See SIMIA.

CAHORS, a considerable town of France, in Querci in Guienne, with a bishop's see and an university. It is seated on a peninsula made by the river Lot, and built partly on a craggy rock. The principal street is very narrow; and terminates in the market-place, in which is the town-houle. The cathedral is a Gothic structure, and has a large square steeple. The fortifications are regular, and the town is surrounded with thick walls. E. Long. 1. 6. N. Lat. 44. 26.

CAHYS, a dry measure for corn, used in some parts of Spain, particularly at Seville and at Cadiz. It is near a bushel of our measure.

CAJANABURG, the capital of the province of Cajania or East Bothnia in Sweden, situated on the north-east part of the lake Cajania, in E. Long. 27. 0. N. Lat. 63. 50.

CAIAPHAS, high-priest of the Jews after Simon, condemned Christ to death; and was put out of his place by the emperor Vitellius, for which disgrace he made away with himself.

CAJAZZO, a town of the province of Lavoro in the kingdom of Naples, situated in E. Long. 15. 0. N. Lat. 41. 15.

CAICOS, the name of some American islands to the north of St Domingo, lying from W. Long. 112. 10. to 113. 16. N. Lat. 21. 40.

CAJPUT, an oil brought from the East Indies resembling that of cardamoms.

CAIETA, (anc. geog.), a port and town of Latium, so called from Æneas's nurse; now *Gaeta*, which see.

CAJETAN (Cardinal), was born at Cajeta in the kingdom of Naples in the year 1469. His proper name was *Thomas de Vio*; but he adopted that of *Cajetan* from the place of his nativity. He defended the authority of the Pope, which suffered greatly at the council of Nice, in a work entitled *Of the power of the Pope*; and for this work he obtained the bishopric of Cajeta. He was afterwards raised to the archiepiscopal see of Palermo, and in 1517 was made a cardinal by Pope Leo X. The year after, he was sent as legate into Germany, to quiet the commotions raised against indulgences by Martin Luther; but Luther, under protection of Frederic elector of Saxony, set him at defiance; for though he obeyed the cardinal's summons in repairing to Augsborg, yet he rendered all his proceedings ineffectual. Cajetan was employed in several other negotiations and transactions, being as ready at business as at letters. He died in 1534. He wrote Commentaries upon Aristotle's philosophy, and upon Thomas Aquinas's theology; and made a literal translation of the Old and New Testaments.

CAIPONG, a large, populous, and rich town of Asia, in China, seated in the middle of a large and well cultivated plain. It stands in a bottom; and when besieged by the rebels in 1642, they ordered the dykes of the river Hohangho to be cut, which drowned the city, and destroyed 300,000 of its inhabitants. E. Long. 113. 27. N. Lat. 35. 0.

CAILLE (Nicholas Louis de la), an eminent mathematician and astronomer, was born at a small town in the diocese of Rheims in 1713. His father had served in the army, which he quitted, and in his retirement studied mathematics; and amused himself with mechanic exercises, wherein he proved the happy author of several inventions of considerable use to the public. Nicholas, almost in his infancy, took a fancy to mechanics, which proved of signal service to him in his maturer years. He was sent young to school at Mantes-sur-Seine, where he discovered early tokens of genius. In 1729, he went to Paris; where he studied the classics, philosophy, and mathematics. Afterwards he went to study divinity at the college de Navarre, proposing to embrace an ecclesiastical life. At the end of three years he was ordained a deacon, and officiated as such in the church of the college de Mazarin several years; but he never entered into priests orders, apprehending that his astronomical studies, to which he became most assiduously devoted, might too much interfere with his religious duties. In 1739, he was conjoined with M. de Thury, son to M. Cassini, in verifying the meridian of the royal observatory through the whole extent of the kingdom of France. In the month of November the same year, whilst he was engaged day and night in the operations which this grand undertaking required, and at a great distance from Paris, he was, without any solicitation, elected into the vacant mathematical chair which the celebrated M. Varignon had so worthily filled. Here he began to teach about the end of 1740; and an observatory was ordered to be erected for his use in the college, and furnished with a suitable apparatus of the best instruments. In May 1741, M. de la Caille was admitted into the royal academy of sciences as an adjoint member for astronomy. Besides the many excellent papers of his dispersed up and down in their memoirs, he published Elements of geometry, metha-

Caille.

Caille,
Caimacan.

nics, optics, and astronomy. Moreover, he carefully computed all the eclipses of the sun and moon that had happened since the Christian æra, which were printed in a book published by two Benedictines, entitled *L'art de vérifier les dates*, &c. Paris, 1750, in 4to. Besides these, he compiled a volume of astronomical ephemerides for the years 1745 to 1755; another for the years 1755 to 1765; a third for the years 1765 to 1775; an excellent work entitled *Astronomie fundamenta novissimis solis et stellarum observationibus stabilita*; and the most correct solar tables that ever appeared. Having gone through a seven years series of astronomical observations in his own observatory, he formed a project of going to observe the southern stars at the Cape of Good Hope. This was highly approved by the academy, and by the prime minister Comte de Argenson, and very readily agreed to by the states of Holland. Upon this, he drew up a plan of the method he proposed to pursue in his southern observations; setting forth, that, besides settling the places of the fixed stars, he proposed to determine the parallax of the moon, Mars, and Venus. But whereas this required correspondent observations to be made in the northern parts of the world, he sent to those of his correspondents who were expert in practical astronomy previous notice, in print, what observations he designed to make at such and such times for the said purpose. At length, on the 21st of November 1750, he sailed for the Cape, and arrived there on the 19th of April 1751. He forthwith got his instruments on shore; and, with the assistance of some Dutch artificers, set about building an astronomical observatory, in which his apparatus of instruments was properly disposed of as soon as it was in a fit condition to receive them.

The sky at the Cape is generally pure and serene, unless when a south-east wind blows. But this is often the case; and when it is, it is attended with some strange and terrible effects. The stars look bigger, and seem to caper; the moon has an undulating tremor; and the planets have a sort of beard like comets. Two hundred and twenty-eight nights did our astronomer survey the face of the southern heavens; during which space, which is almost incredible, he observed more than 10,000 stars; and whereas the ancients filled the heavens with monsters and old-wives tales, the abbe de la Caille chose rather to adorn them with the instruments and machines which modern philosophy has made use of for the conquest of nature*. With no less success did he attend to the parallax of the moon, Mars, Venus, and the sun. Having thus executed the purpose of his voyage, and no present opportunity offering for his return, he thought of employing the vacant time in another arduous attempt; no less than that of taking the measure of the earth, as he had already done that of the heavens. This indeed had, through the munificence of the French king, been done before by different sets of learned men both in Europe and America; some determining the quantity of a degree under the equator, and others under the arctic circle: but it had not as yet been decided whether in the southern parallels of latitude the same dimensions obtained as in the northern. His labours were rewarded with the satisfaction he wished for; having determined a distance of 410,814 feet from a place called *Klip-Fonteyn* to the Cape, by means of a base of 38,802 feet, three times actually measured; whence he

discovered a new secret of nature, namely, that the radii of the parallels in south latitude are not the same as those of the corresponding parallels in north latitude. About the 23^d degree of south latitude he found a degree on the meridian to contain 342,222 Paris feet. He returned to Paris the 27th of September 1754; having in his almost four years absence expended no more than 9144 livres on himself and his companion; and at his coming into port, he refused a bribe of 100,000 livres, offered by one who thirsted less after glory than gain, to be sharer in his immunity from custom-house searches.

After receiving the congratulatory visits of his more intimate friends and the astronomers, he first of all thought fit to draw up a reply to some strictures which professor Euler had published relative to the meridian, and then he settled the results of the comparison of his own with the observations of other astronomers for the parallaxes. That of the sun he fixed at 9³''; of the moon, at 56' 56''; of Mars in his opposition, 36''; of Venus, 38''. He also settled the laws whereby astronomical refractions are varied by the different density or rarity of the air, by heat or cold, and dryness or moisture. And, lastly, he shewed an easy, and by common navigators practicable, method of finding the longitude at sea by means of the moon, which he illustrated by examples selected from his own observations during his voyages. His fame being now established upon to firm a basis, the most celebrated academies of Europe claimed him as their own: and he was unanimously elected a member of the royal society at London; of the institute of Bologna; of the imperial academy at Peterburg; and of the royal academies of Berlin, Stockholm, and Gottingen. In the year 1760, Mr de la Caille was attacked with a severe fit of the gout; which, however, did not interrupt the course of his studies; for he then planned out a new and immense work, no less than a history of astronomy through all ages, with a comparison of the ancient and modern observations, and the construction and use of the instruments employed in making them. In order to pursue the task he had imposed upon himself in a suitable retirement, he obtained a grant of apartments in the royal palace of Vincennes; and whilst his astronomical apparatus was erecting there, he began printing his Catalogue of the southern stars, and the third volume of his Ephemerides. The state of his health was, towards the end of the year 1763, greatly reduced. His blood grew inflamed; he had pains of the head, obstructions of the kidneys, loss of appetite, with an op-pletion of the whole habit. His mind remained unaffected, and he resolutely persisted in his studies as usual. In the month of March, medicines were administered to him, which rather aggravated than alleviated his symptoms; and he was now sensible, that the same distemper which in Africa, ten years before, yielded to a few simple remedies, did in his native country bid defiance to the best physicians. This induced him to settle his affairs: his manuscripts he committed to the care and discretion of his esteemed friend M. Maraldi. It was at last determined that a vein should be opened; but this brought on an obstinate lethargy, of which he died, aged 49.

C AIMACAN, or CAIMACAM, in the Turkish affairs, a dignity in the Ottoman empire, answering to lieuten-

ANT,

* See the
Planisphere
in his *Cælem
australe stel-
lyscum*.

Calman
Cairo.

nant, or rather deputy, amongst us.

There are usually two caimacans; one residing at Constantinople, as governor thereof; the other attending the grand vizir in quality of his lieutenant, secretary of state, and first minister of his council, and gives audience to ambassadors. Sometimes there is a third caimacan, who attends the sultan; whom he acquaints with any public disturbances, and receives his orders concerning them.

CAIMAN ISLANDS, certain American islands lying south of Cuba, and north-west of Jamaica, between 81° and 86° of west longitude, and in 21° of north latitude. They are most remarkable on account of the fishery of tortoise, which the people of Jamaica catch here, and carry home alive, keeping them in pens for food, and killing them as they want them.

CAIN, eldest son of Adam and Eve, killed his brother Abel; for which he was condemned by God to banishment and a vagabond state of life. Cain retired to the land of Nod, on the east of Eden; and built a city, to which he gave the name of his son Enoch.

CAINITES, a sect of heretics in the 2^d century, so called on account of their great respect for Cain. They pretended that the virtue which produced Abel was of an order inferior to that which had produced Cain, and that this was the reason why Cain had the victory over Abel and killed him; for they admitted a great number of geni, which they called *virtues*, of different ranks and orders. They made profession of honouring those who carry in Scripture the most visible marks of reprobation; as the inhabitants of Sodom, Esau, Korah, Dathan, and Abiram. They had, in particular, a very great veneration for the traitor Judas, under pretence that the death of Jesus Christ had saved mankind. They had a forged gospel of Judas, to which they paid great respect.

CAIRNS, the vulgar name of those heaps of stones which are to be seen in many places of Britain, Scotland especially: they were undoubtedly raised in honour of the dead, as appears from the bones and ashes deposited in urns which have been frequently found in them. See ARRAN, n^o 12.; and BARROWS.

CAIRO, or GRAND CAIRO, the capital of Egypt, situated in a plain at the foot of a mountain, in E. Long. 32. o. N. Lat. 30. o. It was founded by Jawhar, a Magrebian general, in the year of the Hegira 358. He had laid the foundations of it under the horoscope of Mars; and for that reason gave his new city the name of *Al Kabirah*, or the *Victorious*, an epithet applied by the Arab astronomers to that planet. In 362, it became the residence of the khalifs of Egypt, and of consequence the capital of that country, and has ever since continued to be so. It is divided into the New and Old cities. Old Cairo is on the eastern side of the river Nile, and is now almost uninhabited. The New, which is properly Cairo, is seated in a sandy plain, about two miles and a half from the old city. It stands on the western side of the Nile, from which it is not three quarters of a mile distant. It is extended along the mountain on which the castle is built, for the sake of which it was removed hither, in order, as some pretend, to be under its protection. However, the change is much for the worse, as well with regard to air as water, and the pleasantness of the prospect. Bulack may be called the port of Cairo; for it

stands on the bank of the Nile, about a mile and a half from it, and all the corn and other commodities are landed there before they are brought to the city. Some travellers have made Cairo of a most enormous magnitude, by taking in the old city Bulack, and the new; the real circumference of it, however, is not above ten miles, but it is extremely populous. The first thing that strikes a traveller is the narrowness of the streets, and the appearance of the houses. These are so daubed with mud on the outside, that you would think they were built with nothing else. Besides, as the streets are unpaved, and always full of people, the walking in them is very inconvenient, especially to strangers. To remedy this, there are a great number of asses, which always stand ready to be hired for a trifle, that is, a penny a mile. The owners drive them along, and give notice to the crowd to make way. And here it may be observed, that the Christians in this, as well as other parts of the Turkish dominions, are not permitted to ride upon horses. The number of the inhabitants can only be guessed at; but we may conclude it to be very great, because, in some years, the plague will carry off 200,000, without their being much missed. The houses are from one to two or three stories high, and flat at the top; where they take the air, and often sleep all night. The better sort of these have a court on the inside like a college. The common run of houses have very little room, and even among great people it is usual for 20 or 30 to lie in the same hall. Some houses will hold 300 persons of both sexes, among whom are 20 or 30 slaves, and those of ordinary rank have generally three or four.

There is a canal called *Halis*, which runs along the city from one end to the other, with houses on each side, which make a large straight street. Besides this, there are several lakes, which are called *hirks* in the language of the country. The principal of these, which is near the castle, is 500 paces in diameter. The most elegant houses in the city are built on its banks; but what is extraordinary, eight months in the year it contains water, and the other four it appears with a charming verdure. When there is water sufficient, it is always full of gilded boats, barges, and barks, in which people of condition take their pleasure towards night, at which time there are curious fire-works, and variety of music.

New Cairo is surrounded with walls built with stone, on which are handsome battlements, and at the distance of every hundred paces there are very fine towers, which have room for a great number of people. The walls were never very high, and are in many places gone to ruin. The basha lives in the castle, which was built by Saladin seven hundred years ago. It stands in the middle of the famous mountain Moketan, which terminates in this place, after it had accompanied the Nile from Ethiopia hither. This castle is the only place of defence in Egypt; and yet the Turks take no notice of its falling, inasmuch that in process of time it will become a heap of rubbish. The principal part in it is a magnificent hall, environed with 12 columns of granite, of a prodigious height and thickness, which sustain an open dome, under which Saladin distributed justice to his subjects. Round this dome there is an inscription in relief, which determines the date and by whom it was built. From this place the whole

whole city of Cairo may be seen, and above 30 miles along the Nile, with the fruitful plains that lie near it, as well as the mosques, pyramids, villages, and gardens, with which these fields are covered. These granite pillars were the work of antiquity, for they were got out of the ruins of Alexandria. There are likewise in the mosques and in the principal houses no less than 40,000 more, besides great magazines, where all kinds are to be had at very low rates. A janitary happened to find five in his garden, as large as those in the castle; but could not find any machine of strength sufficient to move them, and therefore had them sawed in pieces to make mill-stones. It is believed that there have been 30 or 40,000 of these pillars brought from Alexandria, where there are very many more to be had. The gates of Cairo are three, which are very fine and magnificent.

There are about 300 public mosques in this city, some of which have six minarets. The mosque of A-shar hath several buildings adjoining, which were once a famous university, and 14,000 scholars and students were maintained on the foundation; but has now not above 1400, and those are only taught to read and write. All the mosques are built upon the same plan, and differ only in magnitude. The entrance is thro' the principal gate into a large square, open on the top, but well paved. Round this are covered galleries, supported by pillars; under which they say their prayers, in the shade. On one side of the square there are particular places with basins of water, for the convenience of performing the ablutions enjoined by the Koran. The most remarkable part of the mosque, besides the minaret, is the dome. This is often bold, well proportioned, and of an astonishing magnitude. The inside stones are carved like lace, flowers, and melons. They are built so firm, and with such art, that they will last 600 or 700 years. About the outward circumference there are large Arabic inscriptions, in relief, which may be read by those who stand below, though they are sometimes of a wonderful height.

The khanes or caravanseras are numerous and large, with a court in the middle, like their houses. Some are several stories high, and are always full of people and merchandise. The Nubians, the Abyssinians, and other African nations, which come to Cairo, have one to themselves, where they always meet with lodging. Here they are secure from insults, and their effects are all safe. Besides these, there is a bazar, or market, where all sorts of goods are to be sold. This is in a long broad street; and yet the crowd is so great, you can hardly pass along. At the end of this street is another short one, but pretty broad, with shops full of the best sort of goods, and precious merchandise. At the end of this short street there is a great khane, where all sorts of white slaves are to be sold. Farther than this is another khane, where a great number of lasses, of both sexes, are exposed to sale. Not far from the best market-place is an hospital, and a mosque for mad people. They also receive and maintain sick people into this hospital, but they are poorly looked after.

Old Cairo has scarce any thing remarkable but the granaries of Joseph; which are nothing but a high wall, lately built, which includes a square spot of ground, where they deposit wheat, barley, and other

grain, which is a tribute to the basha, paid by the owners of land. This has no other covering but the heavens, and therefore the birds are always sure to have their share. There is likewise a tolerably handsome church, which is made use of by the Copts, who are Christians and the original inhabitants of Egypt. Joseph's well is in the castle, and was made by king Mohammed about 700 years ago. It is called *Joseph's well*, because they attribute every thing extraordinary to that remarkable person. It is cut in a rock, and is 280 feet in depth. The water is drawn up to the top by means of oxen, placed on platforms, at proper distances, which turn about the machines that raise it. The descent is so sloping, that, though there are no steps, the oxen can descend and ascend with ease.

The river Nile, to which not only Cairo but all Egypt is so much indebted, is now known to have its rise in Abyssinia. The increase of the Nile generally begins in May, and in June they commonly proclaim about the city how much it is risen. Over against old Cairo the basha has a house, wherein the water enters to a column, which has lines at the distance of every inch, and marks at every two feet as far as 30. When the water rises to 22 feet, it is thought to be of a sufficient height; when it rises much higher, it does a great deal of mischief. There is much pomp and ceremony used in letting the water into the canal, or hali, above-mentioned. The basha gives the first stroke towards the removal of the dike or dam. When the water has filled the canal and lakes in the city, and the numerous cisterns that are in the mosques and private houses, it is let into a vast plain, to the north-east; the extent of which is 50 miles. When the country is covered with water, it is no unpleasant sight to view the towns appearing like little islands, and the people passing and repassing in boats.

The inhabitants of Cairo, are a mixture of Moors, Turks, Jews, Greeks, and Copts, or Coptis. The only difference between the habit of the Moors and Coptis is their turbans; those of the Moors being white, and of the Coptis white striped with blue. The common people generally wear a long black loose frock, sewed together all down before. The Jews wear a frock of the same fashion, made of cloth; and their caps are like a high crowned hat, without brims, covered with the same cloth, but not so taper. The Jewish womens' are not very unlike the mens, but more light and long. The Greeks are habited like the Turks, only their turbans differ.

Provisions of all kinds are exceeding plenty; for 20 eggs may be bought for a parrah or penny, and bread is six times as cheap as with us. They have almost all sorts of flesh and fish; and in particular have tame buffaloes, which are very useful. They bring goats into the streets in great numbers, to sell their milk. Their gardens are well stocked with fruit-trees of various kinds, as well as roots, herbs, melons, and cucumbers. The most common flesh meat is mutton. The goats are very beautiful, and have ears two feet in length; but their flesh is in no great esteem.

CAIROAN, or CAIRWAN, a city of Africa, in the kingdom of Tunis, seated in a sandy barren soil, about five miles from the gulph of Capres. It has neither spring, well, nor river; for which reason they are obliged

Caithness,
Caithness.

* See *Bur-*
bury, n^o 24,
et seq.

liged to preserve rain-water in tanks and cisterns. It was built by the Aglabites; and is the ancient Cyrene*, but hath now lost its splendor. There is still, however, a very superb mosque, and the tombs of the kings of Tunis are yet to be seen. E. Long. 9. 12. N. Lat. 35. 40.

CAISSON, in the military art, a wooden chest, into which several bombs are put, and sometimes filled only with gunpowder: this is buried under some work whereof the enemy intend to possess themselves, and, when they are masters of it, is fired, in order to blow them up.

CAISSON is also used for a wooden frame or chest used in laying the foundations of the piers of a bridge.

CAITHNESS, otherwise called the *shire of Weick*, is the most northern county of all Scotland; bounded on the east by the ocean, by Strathnaver and Sutherland on the south and south-west: from thence it is divided by the mountain Orde, and a continued ridge of hills as far as Knockfin, then by the whole course of the river Hallowdale. On the north it is washed by the Pentland or Putland frith, which flows between this county and the Orkneys. It extends 35 miles from north to south, and about 20 from east to west. The coast is rocky, and remarkable for a number of bays and promontories. Of these, the principal are Sand-side-head to the west, pointing to the opening of Pentland frith; Orcas, now Holborn-head, and Dunnot-head, both pointing northward to the frith. Dunnot-head is a peninsula about a mile broad, and seven in compass; affording several lakes, good pasture, excellent mill-stones, and a lead-mine. Scribsterbay, on the north-west, is a good harbour, where ships may ride securely. Rice-bay, on the east side, extends three miles in breadth; but is of dangerous access, on account of some sunk rocks at the entrance. At the bottom of this bay appear the ruins of two strong castles, the seat of the earl of Caithness, called *Castle Sinclair*, and Gernego, joined to each other by a draw-bridge. Duncan's bay, otherwise called *Dunthy-head*, is the north-east point of Caithness, and the extremest promontory in Britain. At this place, the breadth of the frith does not exceed 12 miles, and in the neighbourhood is the ordinary ferry to the Orkneys. Here is likewise Clythe's pointing east, and Noshead pointing north-east. The sea in this place is very impetuous, being in continual agitation from violent counter-tides, currents, and vortices. The only island belonging to this county is that of Stroma, in the Pentland frith, at the distance of two miles from the main land, extending about a mile in length, and producing good corn. The navigation is here rendered very difficult by conflicting tides and currents, which at both ends of the island produce a great agitation in the sea. At the south end, the waves dance so impetuously, that the sailors term them the *merry men of May*, alluding to the house of one Mr May, on the opposite shore of Caithness, which served them as a land-mark, in the dangerous passage between the island and the continent. The property of this island was once disputed between the earls of Orkney and Caithness; but adjudged to the latter, in consequence of an experiment, by which it appeared, that venomous creatures will live in Stroma, whereas they die immediately if transported to the Orkneys. The county of Caithness, though chiefly mountainous,

flattens towards the sea-coast, where the ground is arable, and produces good harvests of oats and barley, sufficient for the natives, and yielding a superplus for exportation; but the soil being generally a moist clay, and the climate cold, the harvest is late, and the corn counted inferior in quality to that which is raised in the neighbouring counties. Indeed, the country is better adapted for pasture, and as such is turned to the best advantage. Caithness is well watered with small rivers, brooks, lakes, and fountains, and affords a few woods of birch, but is in general bare of trees; and even those the inhabitants plant, are stunted in their growth. Lead is found at Dennet, copper at Old-Urk, and iron ore at several places; but these advantages are not improved. The air of Caithness is temperate, tho' in the latitude of 58, where the longest day in summer is computed at 18 hours; and when the sun sets, he makes so small an arch of a circle below the horizon, that the people enjoy a twilight until he rises again. The fuel used by the inhabitants of Caithness consists of peat and turf, which the ground yields in great plenty. The forest of Moravins and Berridale afford abundance of red deer and roe-bucks: the country is well stored with hares, rabbits, growse, heathcocks, plover, and all sorts of game, comprehending a bird called *snow-fleet*, about the size of a sparrow, exceedingly fat and delicious, that comes hither in large flights about the middle of February, and takes its departure in April. The hills are covered with sheep and black cattle; so numerous, that a fat cow has been sold at market for 4 s. sterling. The rocks along the coasts are frequented by eagles, hawks, and all manner of sea-fowl, whose eggs and young are taken in vast quantities by the natives. The rivers and lakes abound with trout, salmon, and eels; and the sea affords a very advantageous fishery. Divers obelisks and ancient monuments appear in this district, and several Romish chapels are still standing. Caithness is well peopled with a race of hardy inhabitants, who employ themselves chiefly in fishing, and breeding sheep and black cattle: they are even remarkably industrious; for between Weick and Dumbith, one continued track of rugged rocks, extending 12 miles, they have forced several little harbours for their fishing boats, and cut artificial steps from the beach to the top of the rocks, where they have erected houses, in which they cure and dry the fish for market.

According to Mr Pennant, this county is supposed to send out in some years 2200 head of black cattle, but in bad seasons the farmer kills and sells great numbers for sale. Great numbers of swine are also reared here. These are short, high-backed, long bristled, sharp, slender, and long-nosed; have long erect ears, and moist savage looks. Here are neither barns nor granaries: the corn is threshed out, and preserved in the chaff in byks; which are stacks, in the shape of beehives, thatched quite round, where it will keep good for two years. Vast numbers of salmon are taken at Castle-hill, Dunet, Wick, and Thurso. A miraculous draught at this last place is still talked of, not less than 2500 being taken at one tide within the memory of man; and Mr Smollet informs us, that, in the neighbourhood, above 300 good salmon have been taken at one draught of the net. In the month of November, great numbers of seals are taken in the caverns that o-

Caithness.

Calthnefs,
Caius.

Calus
||
Calabria.

pen into the sea, and run some hundreds of yards under ground. The entrance of these caverns is narrow, but the inside lofty and spacious. The seal-hunters enter these in small boats with torches, which they light as soon as they land, and then with loud shouts alarm the animals, which they kill with clubs as they attempt to pass. This is a hazardous employment; for should the wind blow hard from sea, these adventurers are inevitably lost. Sometimes a large species of seals, 12 feet long, have been killed on this coast; and it is said the same kind are found on the rock Hiskir, one of the western islands. During the spring, great quantities of lump-fish resort to this coast, and are the prey of the seals, as appears from the number of skins of those fishes which at that season float ashore. At certain times, also, the seals seem to be visited by a great mortality; for, at those times, multitudes of them are seen dead in the water. Much limestone is found in this country, which when burnt is made into a compost with turf and sea-plants. The common people are kept in great servitude, and most of their time is given to the lairds, an invincible impediment to the prosperity of the country. The women are also condemned to a shameful drudgery; it not being uncommon to see them trudging in droves of 60 or 70 to the fields with baskets of dung on their backs, which are filled at pleasure from the dunghills by their lords and masters with their pitchforks.

The last private war in Scotland was occasioned by a dispute relating to this country. An earl of Breckinbarne married an heiress of Calthnefs: the inhabitants would not admit her title, but set up another person in opposition. The earl, according to the custom of those times, designed to assert his right by force of arms: he raised an army of 1500 men; but thinking the number too great, he dismissed first one 500, and then another. With the remainder he marched to the borders of Calthnefs. Here he thought proper to add stratagem to force. He knew that the enemy's army waited for him on the other side of the promontory of Ord. He knew also, that whisky was then the nectar of Calthnefs; and therefore ordered a ship laden with that precious liquor to pass round, and wilfully strand itself on the shore. The directions were punctually obeyed; and the crew in a seeming fright elapsed in the boats to the invading army. The Calthnefs men made a prize of the ship; but making too free with the freight, became an easy prey to the earl, who attacked them during their intoxication, and gained the country, which he disposed of very soon after his conquest.

CAIUS, KAYE, or KAYE, (Dr John), the founder of Caius college in Cambridge, was born at Norwich in 1510. He was admitted very young a student in Gonville-hall in the above-mentioned university; and at the age of 21 translated from Greek into Latin some pieces of divinity, and into English Erasmus's paraphrase on Jude, &c. From these his juvenile labours, it seems probable that he first intended to prosecute the study of divinity. Be that as it may, he travelled to Italy, and at Padua studied physic under the celebrated Montanus. In that university he continued some time, where we are told he read Greek lectures with great applause. In 1543, he travelled through part of Italy, Germany, and France; and returning to England commenced doctor of physic at Cambridge. He practised

first at Shrewsbury, and afterwards at Norwich; but removing to London, in 1547, he was admitted fellow of the college of physicians, to which he was several years president. In 1557, being then physician to queen Mary, and in great favour, he obtained a licence to advance Gonville-hall, where he had been educated, into a college; which he endowed with several considerable estates, adding an entire new square at the expense of 1834*l*. Of this college he accepted the mastership, which he kept till within a short time of his death. He was physician to Edward VI. queen Mary, and queen Elizabeth. Towards the latter end of his life he retired to his own college at Cambridge; where, having resigned the mastership to Dr Legge of Norwich, he spent the remainder of his life as a fellow-commoner. He died in July 1573, aged 63; and was buried in the chapel of his own college. Dr Caius was a learned, active, benevolent man. In 1557, he erected a monument in St Paul's to the memory of the famous Linacre. In 1563, he obtained a grant for the college of physicians to take the bodies of two malefactors annually for dissection; and he was the inventor of the *insignia* which distinguish the president from the rest of the fellows. He wrote, 1. *Annals of the college from 1555 to 1572*. 2. *Translation of several of Galen's works*. Printed at different times abroad. 3. *Hippocrates de medicamentis*, first discovered and published by our author; also *De ratione victus*, Lov. 1556, 8vo. 4. *De medendi methodo*. Basil 1544, Lond. 1556, 8vo. 5. *Account of the sweating sickness in England*. Lond. 1556, 1721. It is entitled *De ephemera Britannica*. 6. *History of the university of Cambridge*. Lond. 1568, 8vo. 1574, 4to. in Latin. 7. *De thermis Britannicis*. Doubtful whether ever printed. 8. *Of some rare plants and animals*. Lond. 1570. 9. *De canibus Britannicis*, 1570, 1729. 10. *De pronunciatione Græcæ et Latine linguae*. Lond. 1574. 11. *De libris propriis*. Lond. 1570. Besides many other works which never were printed.

CAKET, a town of Asia, in Persia, in the province of Gurgistan near Mount Caucasus. Its trade consists chiefly in silks. E. Long. 46. 15. N. Lat. 43. 32.

CALABASH, in commerce, a light kind of vessel formed of the shell of a gourd, emptied and dried, serving to put divers kinds of goods in, as pitch, rosin, and the like. The word is Spanish, *Calabaca*, which signifies the same. The Indians also, both of the North and South Sea, put the pearls they have fished in calabashes, and the negroes on the coast of Africa do the same by their gold-dust. The smaller calabashes are also frequently used by these people as a measure, by which they sell these precious commodities to the Europeans. The same vessels likewise serve for putting in liquors; and do the office of cups, as well as bottles, for soldiers, pilgrims, &c.

CALABASH-Tree, in botany. See CRESCENTIA.

African CALABASH-Tree. See BABAB.

CALABRIA, a country of Italy, in the kingdom of Naples, divided into Calabria Ultra, and Calabria Citra, commonly called *Uterior* and *Citerior*, or *Farther* and *Hither Calabria*. Calabria Citerior is one of the 12 provinces of the kingdom of Naples; and bounded on the south by Calabria Ultra, on the north by Basilicata, and on the west and east by the sea: Cosenza is the capital. Calabria Ultra is washed by the Medi-

Calade
Calamine.

Mediterranean sea on the east, south, and west, and bounded by Calabria Citra on the north. Reggio is the capital town.

CALADE, in the menage, the descent or sloping declivity of a rising menage ground, being a small eminence, upon which we ride down a horse several times, putting him to a short gallop, with his fore-hams in the air, to learn him to ply or bend his haunches, and form his stop upon the aids of the calves of the legs, the stay of the bridle, and the cavesson seasonably given.

CALAGORINA, or CALAGURIS, distinguished by the surname *Nafica*, (anc. geog.), a city of the Vascones in the Hither Spain; now *Calaborra*. See the following article.

CALAHORRA, an episcopal town of Spain, in Old Castile, seated in a fertile soil, on the side of a hill which extends to the banks of the river Ebro. W. Long. 2. 7. N. Lat. 42. 12.

CALAIS, a strong town of France, in Lower Picardy, with a citadel and a fortified harbour. It is built in the form of a triangle, one side of which is towards the sea. The citadel is as large as the town, and has but one entrance. It is a trading place, with handsome streets, and several churches and monasteries; the number of inhabitants is reckoned to be 4000. It was taken by king Edward III. in 1347; and was lost in queen Mary's time, in 1557. It was bombarded by the English in 1696, without doing much damage. The fortifications are good; but its greatest strength is its situation among the marshes, which may be overflowed at the approach of an enemy. The harbour is not so good as formerly, nor will it admit vessels of any great burden. In times of peace, there are packet-boats going backward and forward twice a-week from Dover to Calais, which is 21 miles distant. E. Long. 2. 6. N. Lat. 50. 58.

CALAIS and Zetes, in fabulous history, sons of Boreas and Orithia, to whom the poets attributed wings: they went on the voyage of Colchis with the Argonauts, delivered Phineus from the harpies, and were slain by Hercules.

CALAMANCO, a sort of woollen stuff manufactured in England and Brabant. It has a fine gloss; and is checkered in the warp, whence the checks appear only on the right side. Some calamaucos are quite plain, others have broad stripes adorned with flowers, some with plain broad stripes, some with narrow stripes, and others watered.

CALAMARIE, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnaeus; in which he has the following genera, viz. bobartia, scirpus, cyperus, eriophorum, carex, schenus, flagellaria, juncus. See BOTANY, sect. vi. 3.

CALAMATA, a considerable town of Turkey in Europe, in the Morea, and province of Belvedera. It was taken by the Venetians in 1685; but the Turks retook it afterwards with all the Morea. It stands on the river Spinarza, eight miles from the sea. E. Long. 22. 15. N. Lat. 37. 8.

CALAMINE, CALAMY, *Lapis Calaminaris*, or *Cadmia Fossilis*, a sort of stone or mineral, containing zinc, iron, and sometimes other substances. It is considerably heavy, and the more so the better; moderately hard and brittle, or of a consistence betwixt stone and earth: the colour is sometimes whitish or grey;

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Calaminis
Calamus.

sometimes yellowish, or of a deep yellow; sometimes red; sometimes brown or blackish. It is plentiful in several places of Europe, as Hungary, Transylvania, Poland, Spain, Sweden, Bohemia, Saxony, Gosslar, France, and England, particularly in Derbyshire, Gloucestershire, Nottinghamshire, and Somersetshire, as also in Wales. The calamine of England, however, is by the best judges allowed to be superior in quality to that of most other countries. It seldom lies very deep, being chiefly found in clayey grounds near the surface. In some places it is mixed with lead-ores. It is the only true ore of zinc, and is used as an ingredient in making of brass.*—Newman relates various experiments with this mineral, the only result of which was to show that it contained iron as well as zinc. The most remarkable are the following. A saturated solution of calamine in the marine acid, concentrated by evaporating part of the liquor, exhibits in the cold an appearance of fine crystals, which on the application of warmth dissolve and disappear. A little of this concentrated solution tinges a large quantity of water of a bright yellow colour; and at the same time deposits by degrees a fine, spongy, brownish precipitate. Glue dissolved in this solution, and afterwards inspissated, forms an extremely slippery tenacious mass, which does not become dry, and, were it not too expensive, might be of use for entangling flies, caterpillars, &c. Sulphur boiled in the solution seems to acquire some degree of transparency.—This mineral is an article in the materia medica; but, before it comes to the shops, is usually roasted or calcined, in order to separate some arsenical or sulphureous matter which in its crude state it is supposed to contain, and to render it more easily reducible into a fine powder. In this state it is employed in collyria against defluxions of thin acid humours upon the eyes, for drying up moist running ulcers, and healing excoriations. It is the basis of an official euphotic CERATE.

* See Chemistry, no 377

Though the lapis calaminaris is the only native ore of zinc, there is another substance from which that semi-metal is also obtained. This is called *cadmia fornacum*, or *cadmia of the furnaces*, to distinguish it from the other. This is a matter sublimed when ores containing zinc, like those of Rammelsberg, are melted. This cadmia consists of the flowers of the semi-metal sublimed during the fusion, and adhering to the inner surfaces of the walls of furnaces, where they suffer a semi-fusion, and therefore acquire some solidity. So great a quantity of these are collected, that they form very thick incrustations, which must be frequently taken off. The name of *cadmia of the furnaces* has also been given to all the foots and metallic sublimes formed by smelting in the great, although there is certainly a difference in these matters.

CALAMINT, in botany. See MELISSA, and MENTHA.

CALAMUS (Lat.) signifies a reed or cane*.

* See Arundo

CALAMUS, in the ancient poets, denotes a simple kind of pipe or flutula, the musical instrument of the shepherds and herdsmen; usually made either of an oaten stalk or a reed.

CALAMUS Aromaticus, or Sweet-scented Flag, in the materia medica, a species of flag called *acorus* by Linnaeus. See ACORUS.

CALAMUS Scriptorius, in antiquity, a reed or rush to write with. The ancients made use of styles to write

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on

on tables covered with wax; and of reed, or rush, to write on parchment, or Egyptian paper.

CALAMY (Edmund), an eminent presbyterian divine, born at London in the year 1600, and educated at Pembroke-hall, Cambridge, where his attachment to the Arminian party excluded him from a fellowship. Dr Felton bishop of Ely, however, made him his chaplain; and, in 1639, he was chosen minister of St Mary Aldermary, in the city of London. Upon the opening of the long parliament, he distinguished himself in defence of the Presbyterian cause; and had a principal hand in writing the famous *Smectymnus*, which, himself says, gave the first deadly blow to episcopacy. The authors of this tract were five, the initials of whose names formed the name under which it was published; viz. Stephen Marhal, Edmund Calamy, Thomas Young, Matthew Newcomen, and William Sparlow. He was after that an active member in the assembly of divines, was a strenuous opposer of sectaries, and used his utmost endeavours to prevent those violences committed after the king was brought from the Isle of Wight. In Cromwell's time he lived privately, but was assiduous in promoting the king's return; for which he was afterwards offered a bishopric, but refused it. He was ejected from nonconformity in 1662; and died of grief at the sight of the great fire of London.

CALAMY (Edmund), grandson to the preceding (by his eldest son Mr Edmund Calamy, who was ejected out of the living of Moxton in Essex on St Bartholomew's day 1662), was born in London, April 5th 1671. After having learned the languages, and gone through a course of natural philosophy and logic at a private academy in England, he studied philosophy and civil law at the university of Utrecht, and attended the lectures of the learned Grævius. Whilst he resided here, an offer of a professor's chair in the university of Edinburgh was made him by Mr Cartlairs, principal of that university, sent over on purpose to find a person properly qualified for such an office. This he declined; and returned to England in 1691, bringing with him letters from Grævius to Dr Pocock canon of Christchurch and regius professor of Hebrew, and to Dr Bernard Savilian professor of astronomy, who obtained leave for him to prosecute his studies in the Bodleian library. Having resolved to make divinity his principal study, he entered into an examination of the controversy between the conformists and nonconformists; which determined him to join the latter: and coming to London in 1692, he was unanimously chosen assisant to Mr Matthew Sylvester at Blackfriars; and in 1694, he was ordained at Mr Annesley's meeting-house in Little St-Helena, and soon after was invited to become assisant to Mr Daniel Williams in Hand-Alley. In 1702, he was chosen to be one of the lecturers in Salter's-hall; and, in 1703, succeeded Mr Vincent Altop as pastor of a great congregation in Westminster. He drew up the table of contents to Mr Baxter's history of his life and times, which was sent to the press in 1696; made some remarks on the work itself, and added to it an index; and, reflecting on the usefulness of the book, he saw the expediency of continuing it, for Mr Baxter's history came no lower than the year 1684. Accordingly he composed an abridgement of it, with an account of many other ministers who were ejected after the restoration of Charles II.;

their apology, containing the grounds of their nonconformity and practice as to stated and occasional communion with the church of England; and a continuation of their history till the year 1691. This work was published in 1702. He afterwards published a moderate defence of nonconformity, in three tracts, in answer to some tracts of Dr Hoadley. In 1709, Mr Calamy made a tour to Scotland; and had the degree of doctor of divinity conferred on him by the universities of Edinburgh, Aberdeen, and Glasgow. In 1713, he published a second edition of his Abridgement of Mr Baxter's history of his life and times; in which, among other additions, there is a continuation of the history through king William's reign, and queen Anne's, down to the passing of the occasional bill; and in the clofe is subjoined the reformed liturgy, which was drawn up and presented to the bishops in 1661, "that the world may judge (he says in the preface) how fairly the ejected ministers have been often represented as irreconcilable enemies to all liturgies." In 1718, he wrote a vindication of his grandfather, and several other persons, against certain reflections cast upon them by Mr Archdeacon Echard in his History of England; and in 1728 appeared his Continuation of the account of the ministers, lecturers, masters, and fellows of colleges, and schoolmasters, who were ejected, after the restoration in 1660, by or before the act of uniformity. He died June 3^d 1732, greatly regretted not only by the dissenters, but also by the moderate members of the established church, both clergy and laity, with many of whom he lived in great intimacy. Besides the pieces already mentioned, he published a great many sermons on several subjects and occasions. He was twice married, and had 13 children.

CALANDRE, a name given by the French writers to an insect that does vast mischief in granaries. It is properly of the scarab or beetle class; it has two antennæ or horns formed of a great number of round joints, and covered with a soft and short down; from the anterior part of the head there is thrust out a trunk, which is so formed at the end, that the creature easily makes way with it through the coat or skin that covers the grain, and gets at the meal or farina on which it feeds; the inside of the grains is also the place where the female deposits her eggs, that the young progeny may be born with provision about them. When the female has pierced a grain of corn for this purpose, she deposits in it one egg, or at the utmost two, but she most frequently lays them single: these eggs hatch into small worms, which are usually found with their bodies rolled up in a spiral form, and after eating till they arrive at their full growth, they are changed into chrysales, and from these in about a fortnight comes out the perfect calandre. The female lays a considerable number of eggs; and the increase of these creatures would be very great: but nature has so ordered it, that while in the egg state, and even while in that of the worm, they are subject to be eaten by mites; these little vermin are always very plentiful in granaries, and they destroy the far greater number of these larger animals.

CALAS (John), the name of a most unfortunate Protestant merchant at Toulouse, inhumanly butchered under forms of law cruelly prostituted to shelter the sanguinary dictates of ignorant Popish zeal. He had lived

lived 40 years at Toulouse. His wife was an English woman of French extraction; and they had five sons; one of whom, Lewis, had turned Catholic through the persuasions of a Catholic maid who had lived 30 years in the family. In October 1761, the family consisted of Calas, his wife, Mark Anthony their son, Peter their second son, and this maid. Anthony was educated for the bar; but being of a melancholy turn of mind, was continually dwelling on passages from authors on the subject of suicide, and one night in that month hanged himself on a bar laid across two folding doors in their shop. The crowd collected by the confusion of the family on so shocking a discovery, took it into their heads that he had been strangled by the family to prevent his changing his religion, and that this was a common practice among Protestants. The officers of justice adopted the popular tale, and were supplied by the mob with what they accepted as evidences of the fact. 'The fraternity of white penitents got the body, buried it with great ceremony, and performed a solemn service for him as a martyr; the Franciscans did the same: and after these formalities no one doubted the guilt of the devoted heretical family. They were all condemned to the torture, to bring them to confession: they appealed to the parliament; who, as weak and as wicked as the subordinate magistrates, sentenced the father to the torture ordinary and extraordinary, to be broken alive upon the wheel, and then to be burned to ashes. A diabolical decree! which to the shame of humanity was actually carried into execution. Peter Calas, the other son, was banished for life; and the rest were acquitted. The distracted widow found some friends, and among the rest M. Voltaire, who laid her case before the council of state at Versailles, and the parliament of Toulouse were ordered to transmit the proceedings; which argued something like a disposition toward examining into the treatment of this injured family; but France being a Popish government, the voice of justice was stifled.

CALASH, or CALESH, a small light kind of chariot or chair, with very low wheels, used chiefly for taking the air in parks and gardens. The calash is for the most part richly decorated, and open on all sides for the convenience of the air and prospect, or at most inclosed with light mantlets of wax-cloth to be opened and shut at pleasure. In the Philosophical Transactions we have a description of a new sort of calash going on two wheels, not hung on traces, yet easier than the common coaches, over which it has this further advantage, that whereas a common coach will overturn if one wheel go on a surface a foot and an half higher than the other, this will admit of a difference of $3\frac{1}{2}$ feet without danger of overturning. Add, that it would turn over and over; that is, after the spokes being so turned as that they are parallel to the horizon, and one wheel flat over the head of him that rides in it, and the other flat under him, it will turn once more, by which the wheels are placed *in statu quo*, without any disorder to the horse or rider*.

CALASIO (Marius), a Franciscan, and professor of the Hebrew language at Rome, of whom there is very little to be said, but that he published there, in the year 1621, a Concordance of the Bible, which consisted of four great volumes in folio. This work has been highly approved and commended both by

Protestants and Papists, and is indeed a most admirable work. For besides the Hebrew words in the Bible, which are in the body of the book, with the Latin version over against them; there are, in the margin, the differences between the septuagint version and the vulgate; so that at one view may be seen wherein the three Bibles agree, and wherein they differ. Moreover, at the beginning of every article there is a kind of dictionary, which gives the signification of each Hebrew word; affords an opportunity of comparing it with other oriental languages, viz. with the Syriac, Arabic, and Chaldee; and is extremely useful for determining more exactly the true meaning of the Hebrew words.

CALASIRIS, in antiquity, a linen tunic fringed at the bottom, and worn by the Egyptians under a white woollen garment; but this last they were obliged to pull off when they entered the temples, being only allowed to appear there in linen garments.

CALATAJUD, a large and handsome town of Spain, in the kingdom of Arragon; situated at the confluence of the rivers Xalon and Xiloca, at the end of a very fertile valley, with a good castle on a rock. W. Long. 2. 9. N. Lat. 41. 22.

CALATHUS, in antiquity, a kind of hand-basket made of light wood or rushes; used by the women sometimes to gather flowers, but chiefly, after the example of Minerva, to put their work in. The figure of the calathus, as represented on ancient monuments, is narrow at the bottom, and widening upwards like that of a top. Pliny compares it to that of a lily. The calathus or work-basket of Minerva is no less celebrated among the poets than her distaff.

CALATHUS was also the name of a cup for wine, used in sacrifices.

CALATRAVA, a city of new Castile, in Spain, situated on the river Guadiana, 45 miles south of Toledo. W. Long. 4. 20. N. Lat. 39. 0.

Knights of CALATRAVA, a military order in Spain, instituted under Sancho III. king of Castile, upon the following occasion. When that prince took the strong fort of Calatrava from the moors of Andalusia, he gave it to the templars, who, wanting courage to defend it, returned it him again. Then Don Raymond, of the order of the Cistercians, accompanied with several persons of quality made an offer to defend the place, which the king thereupon delivered up to them, and instituted that order. It increased so much under the reign of Alphonsus, that the knights desired they might have a grand master, which was granted. Ferdinand and Isabella afterwards, with the consent of pope Innocent VIII. reunited the grand-mastership of Calatrava to the Spanish crown; so that the kings of Spain are now become perpetual administrators thereof.

The knights of Calatrava bear a cross gules, flowered with green, &c. Their rule and habit was originally that of the Cistercians.

CALAURIA, (anc. geog.), an island of Greece in the Saronic bay, overagainst the port of Troezen, at the distance of 40 stadia. It was 30 stadia in compass, and had a temple of Neptune held in great veneration. It was also an asylum, and the place of the convention or assembly of the seven cities of the Amphictyons. To this place Demosthenes went twice into banishment.

CALCADA, or *St Domingo CALCALDA*, a town of Spain, 9 N 2

*See Meuschen, no 76.

Calcar
Calculation.

Spain, situated in W. Long. 3. 5. N. Lat. 42. 36.
CALCAR, a very strong town of Germany, in the circle of Westphalia, and duchy of Cleves. It belongs to the king of Prussia, and is seated near the Rhine, in E. Long. 5. 41. N. Lat. 51. 45.

CALCAR, in glass-making, the name of a small oven, or reverberatory furnace, in which the first calcination of sand and salt of potashes is made for the turning them into what is called *frit*. This furnace is made in the fashion of an oven, ten feet long, seven broad in the widest part, and two feet deep. On one side of it is a trench six inches square, the upper part of which is level with the calcar, and separated only from it at the mouth by bricks nine inches wide. Into this trench they put sea-coal, the flame of which is carried into every part of the furnace, and is reverberated from the roof upon the *frit*, over the surface of which the smoke flies very black, and goes out at the mouth of the calcar; the coals burn on iron grates, and the ashes fall through.

CALCAR (John de), a celebrated painter, was the disciple of Titian, and perfected himself by studying Raphael. Among other pieces he drew a nativity, representing the angels around the infant Christ; and so ordered the disposition of his picture, that the light all proceeds from the child. He died at Naples, in 1546, in the flower of his age. It was he who designed the anatomical figures of Vesal, and the portraits of the painters of Vclari.

CALCAREOUS EARTHS. See EARTH.

CALCEARIUM, in antiquity, a donative or largess bestowed on Roman soldiers for buying shoes. In monasteries, *calcearium* denoted the daily service of cleaning the shoes of the religious.

CALCHAS, in fabulous history, a famous diviner, followed the Greek army to Troy. He foretold that the siege would last ten years; and that the fleet, which was detained in the port of Aulis by contrary winds, would not fail till Agamemnon's daughter had been sacrificed to Diana. After the taking of Troy, he retired to Colophon; where, it is said, he died of grief, because he could not divine what another of his profession, called *Mopsus*, had discovered.

CALCINATION, in chemistry, the reducing of substances to a calx by fire.*

CALCINATO, a town of Italy, in the duchy of Mantua, remarkable for a victory gained over the Imperialists by the French in 1706. E. Long. 9. 55. N. Lat. 45. 25.

CALCULARY of a PEAR, a congeries of little strong knots dispersed through the whole parenchyma of the fruit. The calculary is most observed in rough-tailed or choak-pears. The knots lie more continuous and compact together towards the pear where they surround the ACETARY. About the stalk they stand more distant; but towards the cork, or stool of the flower, they still grow closer, and there at last gather into the firmness of a plumb-stone. The calculary is no vital or essential part of the fruit; the several knots whereof it consists being only for many concretions or precipitations out of the sap, as we see in urines, wines, and other liquors.

CALCULATION, the act of computing several sums, by adding, subtracting, multiplying, or dividing. See ARITHMETIC.

CALCULATION is more particularly used to signify the computations in astronomy and geometry, for making tables of logarithms, ephemerides, finding the time of eclipses, &c.*

CALCULUS, primarily denotes a little stone or pebble, anciently used in making computations, taking of sufrages, playing at tables, and the like. In after-times, pieces of ivory, and counters struck of silver, gold, and other matters, were used in lieu thereof, but still retaining the ancient names. Computists were by the lawyers called *calculones*, when they were either slaves or newly freed men; those of a better condition were named *calculatores*; or *numerarii*: ordinarily there was one of these in each family of distinction. The Roman judges anciently gave their opinions by calculi, which were white for absolution, and black for condemnation. Hence *calculus albus*, in ancient writers, denotes a favourable vote, either in a person to be absolved and acquitted of a charge, or elected to some dignity or post; as *calculus niger* did the contrary. This usage is said to have been borrowed from the Thracians, who marked their happy or prosperous days by *white*, and their unhappy by *black*, pebbles, put each night into an urn.

Besides the diversity of colour, there were some calculi also which had figures or characters engraven on them, as those which were in use in taking the sufrages both in the senate and at assemblies of the people. These calculi were made of thin wood, polished, and covered over with wax. Their form is still seen in some medals of the Cassian family; and the manner of casting them into the urns, in the medals of the Licinian family. The letters marked upon these calculi were U. R. for *uti rogar*, and A. for *antiquo*; the first of which expressed an approbation of the law, the latter a rejection of it. Afterwards the judges who sat in capital causes used calculi marked with the letter A for *absolvo*; C for *condemno*; and N. L. for *non liquet*, signifying that a more full information was required.

CALCULUS *Humanus*, the stone in the bladder or kidneys. These are commonly formed of different strata or incrustations; sometimes smooth and heavy like mineral stones; but oftener rough, spongy, light, and full of inequalities or protuberances: chemically analysed, or distilled in an open fire, they nearly yield the same principles as urine itself, or at least an empyreumatic volatile urinous matter, together with a great deal of air*. They never have, nor can have, naturally, any foreign matter for a basis: but they may by accident; an instance of which is related by Dr Percival †. A bougie had unfortunately slipped into the bladder, and upon it a stone of a considerable size was formed in less than a year. This stone had so much the appearance of chalk, that the Doctor was induced to try whether it could be converted into quicklime. His experiment succeeded, both with that and some other calculi; from which he conjectures, that hard waters which contain calcareous earth may contribute towards the formation of these calculi. See (the Index subjoined to) MEDICINE.

CALCULUS *Specialis*, or *Literalis*, is the same with ALGEBRA.

CALCUTTA, an English settlement in Asia, on one of the branches of the river Ganges in the kingdom of Bengal. The air here is unhealthy, the water brackish,

Calculation
Calcutta.

* See Astronomy, Geometry, and Logarithms.

* See Chemistry, no 45, 57, 84.

* See Air, no 9.

† *Essays*, Vol. III. p. 165.

Calderium
||
Calderwood

ist, the anchorage not very safe, and the neighbouring country affords but few manufactures. Notwithstanding these inconveniences, great numbers of rich Armenian, Moorish, and Indian merchants, invited by the prospect of liberty and security, have fixed their residence here. The people have multiplied in proportion thro' the territory, which is three or four leagues in circumference, and of which the East India company are the only sovereigns. The fortress called *William's Fort*, has this advantage, that the vessels bound to the European settlements are obliged to pass under its cannon*. The town of Calcutta is remarkable for the fate of those unhappy gentlemen who in 1757 were suffocated in the dungeon called the *Black hole*†.

* See *William's Fort*.

† See *Ben-gal*, vol. 10.

CALDARIUM, in the ancient baths, a certain vault or room made so as to collect the vapours, and produce sweating; whence it signifies a *hot-house*, *bagin*, *stove*, or *sweating-room*.

CALDERINUS (Domitius), a learned critic, born at Calderia near Verona. He read lectures upon polite literature at Rome with great reputation; and was the first who ventured to write upon the most difficult of the ancient poets. He died very young in 1477.

CALDERON, De la Barca, (Dom. Pedro), a Spanish officer, who after having signalized himself in the military profession, quitted it for the ecclesiastical, and then commenced dramatic writer. His dramatic works make 9 vols in 4to, and some Spanish authors have compared him to Shakespeare. He flourished about the year 1640.

CALDERWOOD (David), a famous divine of the church of Scotland, and a distinguished writer in behalf of the Presbyterians, was descended of a good family in that kingdom; and being early designed for the ministry, he applied with great diligence to the study of the Scriptures in their original tongues, the works of the fathers, the councils, and the best writers on church-history. He was settled about the year 1604 at Creling near Jedburgh. King James I. of Great Britain, being desirous of bringing the church of Scotland nearer to a conformity with that of England, laboured earnestly to restore the episcopal authority, and enlarge the powers of the bishops who were then in Scotland. This design was very warmly opposed by many of the ministers, and particularly by Mr David Calderwood; who, when Mr James Law, bishop of Orkney, came to visit the presbyteries of Merse and Teviotdale, declined his jurisdiction by a paper under his hand dated May 5th 1608. But the king having its success much at heart, sent the earl of Dunbar, then high-treasurer of Scotland, with Dr Abbot afterwards archbishop of Canterbury, and two other divines, into that kingdom, with instructions to employ every method to persuade both the clergy and laity of his majesty's sincere desire to promote the good of the church, and of his zeal for the Protestant religion. Mr Calderwood did not assist at the general assembly held at Glasgow June 8th 1610, in which lord Dunbar presided as commissioner; and it appears from his writings, that he looked upon every thing transacted in it as null and void. In May following, king James went to Scotland; and on the 17th of June, held a parliament at Edinburgh: at that time the clergy met in one of the churches, to hear and advise with the bishops; which kind of assembly, it seems, was contri-

ved in order to resemble the English convocation. Mr Calderwood was present at it, but declared publicly that he did not take any such meetings to resemble a convocation; and being opposed by Dr Whitford, and Dr Hamilton, who were friends to the bishops, he took his leave of them in these words: "It is absurd to see men sitting in silks and fattins, and to cry poverty in the kirk, when purity is departing." The parliament proceeded in the mean while in the dispatch of business; and Mr Calderwood, with several other ministers, being informed that a bill was depending to empower the king, with the advice of the archbishops, bishops, and such a number of the ministry as his majesty should think proper, to consider and conclude as to matters decent for the external policy of the church, not repugnant to the word of God; and that such conclusions should have the strength and power of ecclesiastical laws: against this they protested, for four reasons.

1. Because their church was so perfect, that, instead of needing reformation, it might be a pattern to others.
2. General assemblies, as now established by law, and which ought always to continue, might by this means be overthrown.
3. Because it might be a means of creating schism, and disturb the tranquillity of the church.
4. Because they had received assurances, that no attempts should be made to bring them to a conformity with the church of England. They desired therefore, that, for these and other reasons, all thoughts of passing such a law might be laid aside: but in case this be not done, they protest for themselves and their brethren who shall adhere to them, that they can yield no obedience to this law when it shall be enacted, because it is destructive of the liberty of the church; and therefore shall submit to such penalties, and think themselves obliged to undergo such punishments, as may be inflicted on them for disobeying that law. This protest was signed by Mr Archibald Simson on behalf of the members, who subscribed another separate roll, which he kept, for his justification. This protest was presented to the clerk register, who refused to read it before the states in parliament. However, though not read, it had its effect; for although the bill had the consent of parliament, yet the king thought fit to cause it to be laid aside, and not long after called a general assembly at St Andrews. Soon after the parliament was dissolved, and Mr Calderwood was summoned to appear before the high-commission court at St Andrews, on the 8th of July following, to answer for his mutinous and seditious behaviour. July 10th, the king came to that city in person; when Mr Calderwood, being called upon, and refusing to comply with what the king in person required of him, was committed to prison. Afterwards the privy council, according to the power exercised by them at that time, directed him to banish himself out of the king's dominions before Michaelmas next; and not to return without licence. Having applied to the king for a prerogative of his sentence without success, because he would neither acknowledge his offence, nor promise conformity for the future, he retired to Holland, where, in 1623, he published his celebrated piece entitled *Altare Damascenum*. Mr Calderwood having in the year 1624 been afflicted with a long fit of sickness, and nothing having been heard of him, for some time, one Mr Patrick Scot, as Calderwood himself informs us, took it for granted that

he

Caldron
Caledonia.

Caledonia.

he was dead; and thereupon wrote a recantation in his name, as if, before his decease, he had changed his sentiments. This imposture being detected, Scot went over to Holland, and staid three weeks at Amsterdam, where he made a diligent search for the author of Altare Damascenum, with a design to have dispatched him. But Calderwood had privately retired into his own country, where he lived several years. Scot gave out that the king had furnished him with the matter for the pretended recantation, and that he only put it in order. During his retirement, Mr Calderwood collected all the memorials relating to the ecclesiastical affairs of Scotland, from the beginning of the reformation there down to the death of king James; which collection is still preserved in the university library of Glasgow; that which was published under the title of "The true history of Scotland," is only an extract from it. In the advertisement prefixed to the last edition of his Altare Damascenum mention is made of his being minister of Pencaitland near Edinburgh in 1638; but we find nothing said there, or any where else, of his death.

CALDRON, a large kitchen utensil, commonly made of copper; having a moveable iron handle, whereby to hang it on a chimney-hook.

Boiling in CALDRONS, is a capital punishment spoken of in middle-age writers, decreed to divers sorts of criminals, but chiefly to debasers of the coin.

CALDWALL (Richard), a learned English physician, born in Staffordshire about the year 1513. He studied physic in Brazen-Nose college, Oxford; and was examined, admitted unto, and made censor of, the college of physicians at London, all in one day. Six weeks after he was chosen one of the elects; and in the year 1570, was made president of that college. Mr Wood tells us, that he wrote several pieces in his profession; but he does not tell us what they were, only that he translated a book on the art of surgery, written by one Horatio More, a Florentine physician. We learn from Camden, that Caldwell founded a chirurgical lecture in the college of physicians, and endowed it with a handsome salary. He died in 1585.

CALEB, one of the deputies sent by the Israelites to take a view of the land of Canaan. He made a good report of the country, and by this means revived the spirits of the dejected people; on which account, he and Joshua were the only persons who, after their leaving Egypt, settled in the land of Canaan. Caleb had, for his share, the mountains and the city of Hebron, from which he drove three kings. Othniel his nephew having taken the city of Debir, Caleb gave him his daughter Achsah in marriage; and died, aged 114.

CALEDONIA, the ancient name of Scotland*.

CALEDONIA, the name of a settlement made by the Scots, on the west side of the gulph of Darien, in 1698; out of which they were starved at the request of the East-India company: for the English government prohibited the other colonies sending them any provisions; so they were obliged to leave it in 1700.

New CALEDONIA, an island in the south-sea, lately discovered by captain Cook, and, next to New Holland and New Zealand, is the largest island that hath yet been discovered in that sea. It extends from 19. 37. to 22. 30. S. Lat. and from 163. 37. to 167. 14.

E. Long. Its length from north-west to south-east is about 80 leagues; but its greatest breadth does not exceed ten leagues. This island is diversified by hills and valleys of various size and extent. From the hills issue abundance of rivulets, which contribute to fertilize the plains. Along its north-east shore the land is flat; and being well watered, and cultivated by the inhabitants after their manner, appeared to great advantage to captain Cook's people. Was it not, indeed, for those fertile spots on the plains, the whole country might be called a *dreary waste*: the mountains and higher parts of the land are in general incapable of cultivation. They consist chiefly of rocks, many of which are full of mundic; the little soil that is upon them is scorched and burnt up by the sun; it is, however, covered with coarse grass and other plants, and here and there covered with trees and shrubs. The country in general bears a great resemblance to those parts of New South Wales which lie under the same parallel of latitude. Several of its natural productions are the same, and the woods are without underwood as well as in that country. The whole coast seems to be surrounded by reefs and shoals, which render all access to it extremely dangerous; but at the same time guard the coasts against the attacks of the wind and sea; rendering it easily navigable along the coast by canoes, and causing it abound with fish. Every part of the coast seems to be inhabited; the plantations in the plains are laid out with great judgment, and cultivated with much labour. They begin their cultivation by setting fire to the grass, &c. with which the ground is covered, but have no notion of preserving its vigour by manure; they, however, recruit it by letting it lie for some years untouched. On the beach was found a large irregular mass of rock, not less than a cube of ten feet, consisting of a close-grained stone speckled full of granates somewhat bigger than pins heads, from whence it seems probable that some valuable minerals may be found on this island. It differs from all the other islands yet discovered in the South Sea, by being entirely destitute of volcanic productions. Several plants of a new species were found here; and a few young breadfruit trees, not then sufficiently grown to bear fruit, seemed to have come up without culture: plantains and sugar-canes are here in small quantity, and the cocoa-nut trees are small and thinly planted. A new species of passion-flower was likewise met with, which was never known to grow wild any where but in America. Several *Caputi* (MELALEUCA) trees were also found in flower. Musketoes here are very numerous. A great variety of birds were seen of different classes, which were for the most part entirely new; particularly a beautiful species of parrot before unknown to zoologists. A new species of fish, of the genus called by Linnaeus *tetraodon*, was caught here; and its liver, which was very large, presented at supper. Several species of this genus being reckoned poisonous, and the present species being remarkably ugly, Mess. Forsters hinted their suspicions of its quality; but the temptation of a fresh meal, and the assurances of captain Cook that he had formerly eaten this identical sort of fish without harm, got the better of their scruples, and they eat of it. Its oiliness, however, though it had no other bad taste than what proceeded from this, prevented them from taking more than a morsel or two. In a few hours after they had

* See Scotland.

had retired to rest, they were awakened by very alarming symptoms, being all seized with an extreme giddiness; their hands and feet were numbed, so that they were scarcely able to crawl; and a violent languor and oppression seized them. Emetics were administered with some success, but sudorifics gave the greatest relief. Some dogs who had eaten the remainder of the liver were likewise taken ill; and a pig which had eaten the entrails died soon after, having swelled to an unusual size. The effects of this poison on the gentlemen did not go entirely off in less than six weeks.—Abundance of turtle was seen here. The natives had not the least notion of goats, hogs, dogs, or cats, and had not even a name for any of them.

The inhabitants are very stout, tall, and in general well proportioned; their features mild; their beards and hair black, and strongly frizzled, so as to be somewhat woolly in some individuals: their colour is swarthy, or a dark chestnut brown. A few were seen who measured six feet four inches. They are remarkably courteous, not at all addicted to pilfering and stealing; in which character of honesty they are singular, all the other nations in the South Sea being remarkably thievish. Some wear their hair long, and tie it up to the crown of their heads; others suffer only a large lock to grow on each side, which they tie up in clubs; many others, as well as all the women, wear it cropped short. They make use of a kind of comb made of sticks of hard wood from seven to nine or ten inches long, and about the thickness of knitting needles; a number of these, seldom exceeding 20, but generally fewer, are fastened together at one end, parallel to and near one tenth of an inch from each other; the ends, which are a little pointed, will spread out or open like the flicks of a fan. These combs they always wear in their hair on one side of their head. Some had a kind of concave cylindrical stiff black cap, which appeared to be a great ornament among them, and was supposed to be worn only by the chiefs and warriors. A large sheet of strong paper, whenever they got one in exchange, was commonly applied to this purpose. The men go naked; only tying a string round their middle, and another round their neck. A little piece of a brown cloth made of the bark of a fig-tree, sometimes tucked up to the belt, and sometimes pendulous, scarcely deserves the name of a covering; nor indeed does it seem at all intended for that purpose. This piece of cloth is sometimes of such a length, that the extremity is fastened to the string round the neck; to this string they likewise hang small round beads of a pale green nephritic stone. Coarse garments were seen among them made of a sort of matting; but they seemed never to wear them, except when in their canoes and unemployed. The women seemed to be in a servile state: they were the only persons of the family who had any employment, and several of them brought bundles of sticks and fuel on their backs: those who had children carried them on their backs in a kind of fatchel. The women also were seen to dig up the earth in order to plant it. They are in general of a dark chestnut, and sometimes mahogany brown; their stature middle-sized, some being rather tall, and their whole form rather stout, and somewhat clumsy. Their dress is the most disfiguring that can be imagined, and gives them a thick squat shape; it is a short petticoat

or fringe, consisting of filaments or little cords, about eight inches long, which are fastened to a very long string, which they have tied several times round their waist. The filaments, or little ropes, therefore, lie above each other in several layers, forming a kind of thick thatch all round the body, but which does not near cover the thigh: these filaments were sometimes dyed black; but frequently those on the outside only were of that colour, the rest being of a dirty grey. There was not a single infant, during the ship's stay in this island, of the women permitting any indecent familiarity with an European: they took pleasure in practising the arts of a jilting coquette, but never became absolute wantons. The general ornaments of both sexes are ear-rings of tortoise shells; necklaces, or amulets, made both of shells and stones; and bracelets made of large shells, which they wear above the elbows.

The houses, or huts, in New Caledonia, are circular, something like a bee-hive, and full as close and warm; the entrance is by a small door, or long square hole, just big enough to admit a man bent double: the side walls are about four feet and a half high; but the roof is lofty, and peaked to a point at the top, above which is a post or stick of wood, which is generally ornamented either with carving or shells, or both. The framing is of small spars, reeds, &c. and both sides and roof are thick, and close covered with thatch made of coarse long grass. In the inside of the house are set up posts, to which cross spars are fastened, and platforms made, for the convenience of laying any thing on. Some houses have two floors, one above another; the floor is laid with dried grass, and here and there mats are spread for the principal people to sit or sleep on. In these houses there was no passage for the smoke but through the door; they were intolerably smoky, and so hot as to be insupportable to those unaccustomed to them: probably the smoke is intended to drive out the musketoes which swarm here. They commonly erect two or three of these huts near each other under a cluster of lofty fig-trees, whose leaves are impervious to the rays of the sun.

The canoes used here are very heavy clumsy vessels; they are made of two trees hollowed out, having a raised gunnel about two inches high, and closed at each end with a bulk head of the same height; so that the whole is like a long square trough about three feet shorter than the body of the canoe. Two canoes thus fitted are fastened to each other about three feet asunder, by means of cross spars, which project about a foot over each side. Over these is laid a deck or heavy platform made of plank and small round spars, on which they have a fire-hearth, and generally a fire burning; they are navigated by one or two latten sails, extended to a small latten yard, the end of which is fixed in a notch or hole in the deck.

Notwithstanding the inoffensive disposition of the inhabitants of New Caledonia, they are well provided with offensive weapons; as clubs, spears, darts, and slings for throwing stones. Their clubs are about two feet and an half long, and variously formed; some like a scythe, others like a pick-axe; some have a head like a hawk, and others have round heads, but all are neatly made; many of their darts and spears are no less neat, and ornamented with carvings. The slings are as simple as possible; but they take some pains to form the

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the stones that they use into a proper shape, which is something like an egg, supposing both ends to be like the small one. They drive the dart by the assistance of short cords knobbed at one end and looped at the other, called by the seamen *beckets*. These contained a quantity of red wool taken from the vampyre, or great Indian bat. Bows and arrows are wholly unknown among them.

Their language bears no affinity to that spoken in the other South-sea islands, the word *arreeke* and one or two more excepted. This is the more extraordinary, as different dialects of one language were spoken not only in the easterly islands, but at New Zealand.

A musical instrument, a kind of whistle, was procured here. It was a little polished piece of brown wood about two inches long, shaped like a kind of bell, tho' apparently solid, with a rope fixed at the small end; two holes were made in it near the base, and another near the insertion of the rope, all which communicated with each other; and by blowing in the uppermost, a shrill sound like whistling was produced: no other instrument was seen among them that had the least relation to music.

Many of the New-Caledonians were seen with prodigiously thick legs and arms, which seemed to be affected with a kind of leprosy; the swelling was found to be extremely hard, but the skin was not alike harsh and scaly in all those who were afflicted with the disorder. The preternatural expansion of the arm or leg did not appear to be a great inconvenience to those who suffered it; and they seemed to intimate that they very rarely felt any pain in it; but in some the disorder began to form blotches, which are marks of a great degree of virulence.

Here they bury their dead in the ground. The grave of a chief who had been slain in battle here resembled a large mole-hill, and was decorated with spears, darts, paddles, &c. all stuck upright in the ground round about it. Lieutenant Pickersgill was shewed a chief whom they named *Tea-booma*, and styled their *arreeke* or king; but nothing further is known of their government, and nothing at all of their religion.

CALEFACTION, the production of heat in a body from the action of fire, or that impulse impressed by a hot body on others around it. This word is used in pharmacy, by way of distinction from *cottion*, which implies boiling; whereas calefaction is only heating a thing.

CALEMBERG, a castle of Germany, in the duchy of Brunswick and principality of Calenberg. It is seated on the river Leine, and is 15 miles south of Hanover. It is subject to the duke of Brunswick Lunenburg, elector of Hanover, and king of Great Britain. E. Long. 9. 43. N. Lat. 52. 20.

CALEMBERG, a principality of Lower Saxony, and one of the three parts of the duchy of Brunswick, is bounded on the north by the duchy of Verden, on the east by the principality of Zell, on the south by the principalities of Grubenhagen and Wolfenbüttele, and on the west by Westphalia. It belongs to the elector of Hanover.

CALENDAR, in astronomy and chronology. See **KALENDAR**.

CALENDAR of prisoners, in law, a list of all the prisoners names in the custody of each respective sheriff.

CALENDARIUM FLORÆ, in botany, a calendar containing an exact register of the respective times in which the plants of any given province or climate germinate, expand, and shed their leaves and flowers, or ripen and disperse their seeds. For particulars on this curious subject, see the articles **DEFOLIATIO**, **EFFLORESCENTIA**, **FRONDESCENTIA**, **FRUCTESCENTIA**, and **GERMINATIO**.

CALENDER, a machine used in manufactories to press certain woollen and silken stuffs and linens, to make them smooth, even, and glossy, or to give them waves, or water them, as may be seen in mohairs and tabbies. This instrument is composed of two thick cylinders or rollers, of very hard and well polished wood, round which the stuffs to be calendered are wound: these rollers are placed cross-wise between two very thick boards, the lower serving as a fixed base, and the upper moveable by means of a thick screw with a rope fastened to a spindle which makes its axis: the uppermost board is loaded with large stones weighing 20,000 lb or more. At Paris they have an extraordinary machine of this kind, called the *royal calender*, made by order of M. Colbert. The lower table or plank is made of a block of smooth marble, and the upper is lined with a plate of polished copper.—The alternate motion of the upper board sometimes one way and sometimes another, together with the prodigious weight laid upon it, gives the stuffs their gloss and smoothness; or gives them the waves, by making the cylinders on which they are put roll with great force over the undermost board. When they would put a roller from under the calender, they only incline the undermost board of the machine. The dressing alone, with the many turns they make the stuffs and linens undergo in the calender, gives the waves, or waters them, as the workmen call it. It is a mistake to think, as some have asserted, and Mr Chambers among others, that they use rollers with a shallow indenture or engraving cut into them.

CALENDERS, a sort of Mahometan friars, so called from Santon Calenderi their founder. This Santon went bareheaded, without a shirt, and with the skin of a wild beast thrown over his shoulders. He wore a kind of apron before, the strings of which were adorned with counterfeit precious stones. His disciples are rather a sect of Epicureans, than a society of religious. They honour a tavern as much as they do a mosque; and think they pay as acceptable worship to God by the free use of his creatures, as others do by the greatest austerities and acts of devotion. They are called, in Persia and Arabia, *Abdals*, or *Abdallat*, i. e. persons consecrated to the honour and service of God. Their garment is a single coat, made up of a variety of pieces, and quilted like a rug. They preach in the market-places, and live upon what their auditors bestow on them. They are generally very vicious persons; for which reason they are not admitted into any houses.

CALENDS, in Roman antiquity. See **KALENDS**.
CALENDULA, the *MARYGOLD*; a genus of the polygamia necessaria order, belonging to the syngenesia class of plants. Of this there are eight species, none of them natives of Europe. The common kind is so well known as to need no definition; and none of the others

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* See the article *Execution*.

others merit any, except the fruticosa, which hath lately been introduced from the Cape of Good Hope. It hath a slender, shrubby, perennial stalk, which rises to the height of seven or eight feet, but requires support: this sends out a great number of weak branches from the bottom to the top, which hang downward unless they are supported: they are garnished with oval leaves, having short flat footstalks; these are of a shining green colour on their upper side, but paler underneath: the flowers come out at the end of the branches, on short naked footstalks. This is easily propagated by cuttings, which may be planted at any time in summer in a shady border, or otherwise shaded with mats in the heat of the day: in five or six weeks these will have taken root, when they should be separately taken up, each put in a separate pot, and placed in the shade till they have taken fresh root; then they may be placed, with other hardy exotic plants, in a sheltered situation, where they may remain till the frost begins, when they must be removed into the green-house, placing them near the windows that they may enjoy the free air; for this plant only requires protection from frost. The seeds of the common fort may be sown in March or April, where the plants are to remain; and will require no other culture but to keep them clear of weeds, and to thin the plants where they are too thick. The flowers of the common marigold are supposed to be aperient and attenuating, as also cardiac, alexipharmac, and sudorific; they are principally celebrated in uterine obstructions, the jaundice, and for throwing out the small-pox. Their sensible qualities, however, give little foundation for these virtues: they have scarce any taste, and have no considerable smell. The leaves of the plant discover a viscid sweetness, accompanied with a more durable saponaceous pungency and warmth: these seem capable of answering some useful purposes as a stimulating, aperient, and antiscorbutic medicine.

CALENTIUS (Eliſius), a Neapolitan poet and prose author. He was preceptor to Frederic the son of Ferdinand king of Naples, and the earliest writer on the illegality of putting criminals to death except for murder. Died in 1503.

CALENTURE, a feverish disorder incident to sailors in hot countries; the principal symptom of which is their imagining the sea to be green fields: hence, attempting to walk abroad in these imaginary places of delight, they are frequently lost. Vomiting, bleeding, a spare diet, and the neutral salts, are recommended in this disorder; a single vomit commonly removing the delirium, and the cooling medicines completing the cure.

CALEPIN (Ambrosius), an Augustin monk of Caplepio, whence he took his name, in the 16th century. He is author of a dictionary of eight languages, since augmented by Passerat and others.

CALES (anc. geog.), a municipal city of some note in Campania, at no great distance from Capilinum. The epithet *Calenur* is by Horace and Juvenal applied to a generous wine which the territory produced.

CALETES, (anc. geog.), a people of Gallia Celtica, on the confines of Belgica, situated between the sea and the Sequana. Now called *le Pais de Gaux*, in Normandy.

CALETURE, a fort on the island of Ceylon, at Vol. III.

the mouth of a river of the same name. The Dutch became masters of it in 1655; but were afterwards obliged to leave it. E. Long. 80. 51. N. Lat. 6. 38.

CALF, in zoology, the young of the ox kind.

There are two ways of breeding calves that are intended to be reared. The one is to let the calf run about with its dam all the year round; which is the method in the cheap breeding countries, and is generally allowed to make the best cattle. The other is to take them from the dam after they have suckled about a fortnight; they are then to be taught to drink flat milk, which is to be made but just warm for them, it being very dangerous to give it them too hot. The best time of weaning calves is from January to May: they should have milk for 12 weeks after; and a fortnight before that is left off, water should be mixed with the milk in larger and larger quantities. When the calf has been fed on milk for about a month, little whisps of hay should be placed all about him in cleft sticks to induce him to eat. In the beginning of April they should be turned out to graze; only for a few days they should be taken in for the night, and have milk and water given them: the same may also be given them in a pail sometimes in the field, till they are so able to feed themselves that they do not regard it. The grafs they are turned into must not be too rank, but short and sweet, that they may like it, and yet get it with some labour. Calves should always be weaned at grafs; for if it be done with hay and water, they often grow big-belly'd on it, and are apt to rot. When those among the males are selected which are to be kept as bulls, the rest should be gelt for oxen: the sooner the better. Between 10 and 20 days is a proper age. About London almost all the calves are fatted for the butcher. The reason of this is, that there is a good market for them; and the lands there are not so profitable to breed upon as in cheaper countries. The way to make calves fat and fine is, the keeping them very clean; giving them fresh litter every day; and the hanging a large chalk-stone in some corner where they can easily get at it to lick it, but where it is out of the way of being soiled by their dung and urine. The coops are to be placed so as not to have too much fun upon them, and so high above the ground that the urine may run off. They also bleed them once when they are a month old, and a second time before they kill them; which is a great addition to the beauty and whiteness of their flesh: the bleeding is by some repeated much oftener, but this is sufficient. Calves are very apt to be loose in their bowels; which waistes and very much injures them. The remedy is to give them chalk scraped among milk, pouring it down with a horn. If this does not succeed, they give them bole armenic in large doses, and use the cold bath every morning. If a cow will not let a strange calf suck her, the common method is to rub both her nose and the calf's with a little brandy; this generally reconciles them after a few smellings.

Golden CALF, an idol set up and worshipped by the Israelites at the foot of Mount Sinai in their passage through the wilderness to the land of Canaan. Our version makes Aaron fashion this calf with a graving tool after he had cast it in a mould: the Geneva translation makes him engrave it first, and cast it afterwards. Others, with more probability, render the whole verse

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thus: "And Aaron received them, (the golden earrings), and tied them up in a bag, and got them cast into a molten calf;" which version is authorised by the different senses of the word *tsur*, which signifies to tie up or bind, as well as to shape or form; and of the word *cherret*, which is used both for a graving tool and a bag. Some of the ancient fathers have been of opinion that this idol had only the face of a calf, and the shape of a man from the neck downwards, in imitation of the Egyptian Isis. Others have thought it was only the head of an ox without a body. But the most general opinion is, that it was an entire calf in imitation of the Apis worshipped by the Egyptians; among whom, no doubt, the Israelites had acquired their propensity to idolatry. This calf Moses is said to have burnt with fire, reduced to powder, and strewn upon the water which the people were to drink. How this could be accomplished hath been a question. Most people have thought, that as gold is indelible, it could only be burnt by the miraculous power of God; but M. Stahl conjectures that Moses dissolved it by means of liver of sulphur †. The Rabbins tell us that the people were made to drink of this water in order to distinguish the idolaters from the rest; for that as soon as they had drunk of it, the beards of the former turned red. The cabbalists add, that the calf weighed 125 quintals; which they gather from the Hebrew word *massékah*, whose numerical letters make 125.

See CALF. See PHOCA.

CALI, a town of Popayan in South America, seated in a valley of the same name on the river Cauca. The governor of the province usually resides there. W. Long. 78. 5. N. Lat. 3. 15.

CALIBER, or CALIPER, properly denotes the diameter of any body; thus we say, two columns of the same caliber, the caliber of the bore of a gun, the caliber of a bullet, &c.

CALIBER-Compasser, a sort of compasses made with arched legs to take the diameter of round or swelling bodies. See COMPASSES.

Caliber-compasses, are chiefly used by gunners, for taking the diameters of the several parts of a piece of ordnance, or of bombs, bullets, &c. Their legs are therefore circular; and move on an arch of brass, whereon is marked the inches and half inches, to show how far the points of the compasses are opened asunder.

Some are also made for taking the diameter of the bore of a gun or mortar.

The gaugers also sometimes use calipers, to embrace the two heads of any cask, in order to find its length.

The calipers used by carpenters and joiners, is a piece of board notched triangular-wise in the middle for the taking of measure.

CALIBER-Rule, is an instrument, wherein a right line is so divided, as that the first part being equal to the diameter of an iron or leaden ball of one pound weight, the other parts are to the first, as the diameters of balls of two, three, four, &c. pounds, are to the diameter of a ball of one pound. The caliper is used by engineers, from the weight of the ball given, to determine its diameter or caliper, or vice versa.

CALICOULAN, or QUILLON, a town of Asia, in the East Indies, on the coast of Malabar, and in the peninsula on this side the Ganges, where the Dutch have a factory. E. Long. 75. 21. N. Lat. 9. 5.

Calicut
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California.

CALICUT, a kingdom of India, on this side the Ganges, upon the coast of Malabar. It is about 63 miles long, and as much broad. It has many woods, rivers, and marshes, and is very populous; but does not produce much corn, abundance of rice being imported from Canara. The land along the sea-coast is low and sandy, and produces a number of cocoa-trees. The higher grounds produce pepper and cardamoms of a very good quality. They have likewise timber for building, white and yellow sanders, cassia lignea, cassia fistula, nux vomica, and cocculus indicus. The woods abound with parrots and monkeys, as well as different kinds of game. They have also plenty of fish, several sorts of medicinal drugs, and their mountains produce iron. The *samorin*, or king, of Calicut, was once master of all the coast of Malabar; but at his death he left it by will among four of his nephews. He who governs Calicut has a palace of stone, and there is some appearance of grandeur about his court. He carries on a considerable trade, which makes the people of Calicut richer than their neighbours. In former times they had several strange customs, some of which are still kept up; particularly the samoria's wife must be first enjoyed by the high priest, who may have her three nights if he pleases. The nobles permit the other priests to take the same liberty, but the lower people cannot have that honour. A woman may marry a number of husbands; each of whom has her ten days or more by turns, as they agree among themselves; and provides her all things necessary during that time. When she proves with child, she names the father; who, after the child is weaned, takes care of its education. These people have no pens, ink, or paper; but write with a bodkin on flags that grow by the sides of the rivers. By this means the letters are in some sense engraved; and so tough are the flags, that they will last for a great number of years. This was the first land discovered by the Portuguese in 1498.

CALICUT, a town of Asia, in the kingdom of that name on the coast of Malabar. It contains a great number of mean low houses, each of which has a garden. The English had a factory here, but it is removed to Tilicherry. E. Long. 76. 4. N. Lat. 11. 21.

CALIDÆ PLANTÆ; (from *calor* heat); plants that are natives of warm climates. Such are those of the East Indies, South America, Egypt, and the Canary Islands. These plants, says Linnæus, will bear a degree of heat which is as 40 on a scale in which the freezing point is 0, and 100 the heat of boiling water. In the 10th degree of cold they cease to grow, lose their leaves, become barren, are suffocated, and perish.

CALIDUCT, in antiquity, a kind of pipes or canal disposed along the walls of houses or apartments, used by the ancients for conveying heat to several remote parts of the house from one common furnace.

CALIFORNIA, the most northerly of all the Spanish dominions on the continent of America, is sometimes distinguished by the names of *New Albion*, and the *Isles Carabiras*; but the most ancient appellation is *California*; a word probably owing to some accident, or to some words spoken by the Indians and misunderstood by the Spaniards. For a long time California was thought to be an island; but Father Caining, a German Jesuit, discovered it to be a peninsula joining to the coast of New Mexico and the southern parts of America.

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† See Chemi-
stry, n^o 311
—325.

rica. This peninsula extends from Cape St Sebastian, lying in north latitude 43. 30. to Cape St Lucar which lies in north latitude 22. 32. It is divided from New Mexico by the gulph, or as some call it the *laks*, of California, or *Vermilion Sea*, on the east; on the north, by that part of the continent of North America which is least known; and on the west and south, by the Pacific Ocean or great South Sea. The coasts, especially towards the Vermilion Sea, are covered with inhabited islands, on some of which the Jesuits have established settlements, such as St Clement, Paxaros, St Anne, Cedars (so called from the great number of these trees it produces), St Joseph, and a multitude of others. But the islands best known are three lying off Cape St Lucar, towards the Mexican coast. These are called *Les Tres Marias*, "the three Marias." They are but small, have good wood and water, salt pits, and abundance of game; therefore the English and French pirates have sometimes wintered there, when bound on cruizes in the South Seas.

As California lies altogether within the temperate zone, the natives are neither chilled with cold, nor scorched with heat; and indeed the improvements in agriculture made by the Jesuits afford strong proofs of the excellency of the climate. In some places the air is extremely hot and dry; and the earth wild, rugged, and barren. In a country stretching about 800 miles in length, there must be considerable variations of soil and climate; and indeed we find, from good authority, that California produces some of the most beautiful lawns, as well as many of the most inhospitable deserts, in the universe. Upon the whole, although California is rather rough and craggy, we are assured by the Jesuit Vinegas, and other good writers, that with due culture it furnishes every necessary and convenience of life; and that, even where the atmosphere is hottest, vapours rising from the sea, and dispersed by pleasant breezes, render it of a moderate temperature.

The peninsula of California is now stocked with all sorts of domestic animals known in Spain and Mexico. Horses, mules, asses, oxen, sheep, hogs, goats, and all other quadrupeds imported, thrive and increase in this country. Among the native animals is a species of deer of the size of a young heifer, and greatly resembling it in shape; the head is like that of a deer, and the horns thick and crooked like those of a ram. The hoof of the animal is large, round, and cloven, the skin spotted, but the hair thinner and the tail sharper than those of a deer. Its flesh is greatly esteemed. There is another animal peculiar to this country, larger and more bulky than a sheep, but greatly resembling it in figure, and, like it, covered with a fine black or white wool. The flesh of this animal is nourishing and delicious; and, happily for the natives, it is so abundant, that nothing more is required than the trouble of hunting, as these animals wander about in droves in the forests and on the mountains. Father Torquemado describes a creature which he calls a *species of large bear*, something like a buffalo, of the size of a steer, and nearly of the figure of a stag. Its hair is a quarter of a yard in length, its neck long and aukward, and on its forehead are horns branched like those of a stag. The tail is a yard in length and half a yard in breadth; and the hoofs cloven like those of an ox. With regard to birds, we have but an imperfect account; only, in ge-

neral, Father Venegas tells us that the coast is plentifully stored with peacocks, bullards, geese, cranes, and molt of the birds common in other parts of the world. The quantity of fish which resort to these coasts are incredible. Salmon, turbot, barbel, skate, mackerel, &c. are caught here with very little trouble; together with pearl oysters, common oysters, lobsters, and a variety of exquisite shell-fish. Plenty of turtle are also caught on the coasts. On the South Sea coasts are some shell-fish peculiar to it, and perhaps the most beautiful in the world; their lustre surpassing that of the finest pearl, and darting their rays through a transparent varnish of an elegant vivid blue, like the lapis lazuli. The fame of California for pearls soon drew forth great numbers of adventurers, who searched every part of the gulph, and are still employed in that work, notwithstanding fashion has greatly diminished the value of this elegant natural production. Father Torquemado observes that the sea of California affords very rich pearl fisheries; and that the *hosiars*, or beds of oysters, may be seen in three or four fathom water, almost as plain as if they were on the surface.

The extremity of the peninsula towards Cape St Lucar is more level, temperate, and fertile, than the other parts, and consequently more woody. In the more distant parts, even to the farthest missions on the east coast, no large timber hath yet been discovered. A species of manna is found in this country, which, according to the accounts of the Jesuits, has all the sweetness of refined sugar without its whiteness. The natives firmly believe that this juice drops from heaven.

The Californians are well made, and very strong. They are extremely pusillanimous, inconstant, stupid, and even insensible, and seem extremely deserving of the character given to the Indians in general, under the article AMERICA. Before the Europeans penetrated into California, the natives had no form of religion. The missionaries indeed tell us many tales concerning them, but they so evidently bear the marks of forgery as not to be worth repeating. Each nation was then an assemblage of several cottages more or less numerous, that were all mutually confederated by alliances, but without any chief. They were strangers even to filial obedience. No kind of dress was used by the men; but the women made use of some coverings, and were even fond of ornamenting themselves with pearls and such other trinkets as the country afforded. What mostly displayed their ingenuity was the construction of their fishing nets, which are said by the Jesuits to have even exceeded in goodness those made in Europe. They were made by the women, of a coarse kind of flax procured from some plants which grow there. Their houses were built of branches and leaves of trees: nay, many of them were only inclosures of earth and stone, raised half a yard high, without any covering; and even these were so small, that they could not stretch themselves at length in them. In winter, they dwelt under ground in caves either natural or artificial.

In 1526, Ferdinand Cortez, having reduced and settled Mexico, attempted the conquest of California; but was obliged to return, without even taking a survey of the country, a report of his death having diffused the Mexicans to a general insurrection. Some other

California.

attempts were made by the officers of Cortez, but these were also unsuccessful; and this valuable coast was long neglected by the Spaniards, who, to this day, have but one settlement upon it. In 1595, a galleon was sent to make discoveries on the Californian shore; but the vessel was unfortunately lost. Seven years after, the count de Monterey, then viceroy of New Spain, sent Sebastian Biscayno on the same design with two ships and a tender; but he made no discovery of importance. In 1684, the marquis de Laguna, also viceroy of New Spain, dispatched two ships with a tender to make discoveries on the lake of California. He returned with an indifferent account, but was among the first that asserted that California was not an island; which was afterwards confirmed by Father Caino, as already related. In 1697, the Spaniards being discouraged by their losses and disappointments, the Jesuits solicited and obtained permission to undertake the conquest of California. They arrived among the savages with curiosities that might amuse them, corn for their food, and clothes for which they could not but perceive the necessity. The hatred these people bore the Spanish name could not support itself against these demonstrations of benevolence. They testified their acknowledgments as much as their want of sensibility and their inconstancy would permit them. These faults were partly overcome by the religious institutors, who pursued their project with a degree of warmth and resolution peculiar to the society. They made themselves carpenters, masons, weavers, and husbandmen; and by these means succeeded in imparting knowledge, and in some measure a taste for the useful arts, to this savage people, who have been all successively formed into one body. In 1745, they composed 43 villages, separated from each other by the barrenness of the soil and the want of water. The inhabitants of these small villages subsist principally on corn and pulse, which they cultivate; and on the fruits and domestic animals of Europe, the breeding of which last is an object of continual attention. The Indians have each their field, and the property of what they reap; but such is their want of foresight, that they would squander in a day what they had gathered, if the missionary did not take upon himself to distribute it to them as they stand in need of it. They manufacture some coarse stuffs; and the necessities they are in want of are purchased with pearls, and with wine nearly resembling that of Madeira, which they sell to the Mexicans and to the galleons, and which experience hath shewn the necessity of prohibiting in California. A few laws, which are very simple, are sufficient to regulate this rising state. In order to enforce them, the missionary chooses the most intelligent person of the village; who is empowered to whip and imprison, the only punishments of which they have any knowledge. In all California there are only two garisons, each consisting of 30 men, and a soldier with every missionary. These troops were chosen by the legislators, though they are paid by the government. Were the court of Madrid to push their interest with half the zeal of the Jesuits, California might become one of the most valuable of their acquisitions, on account of the pearls and other valuable articles of commerce which the country contains. At present the little Spanish town near Cape St. Lucar is made use of for no other purpose than as a place of refreshment for the

Manila ship, and the head residence of the missionaries.

CALIGULA, the Roman emperor and tyrant, A. D. 37, began his reign with every promising appearance of becoming the real father of his people; but at the end of eight months he was seized with a fever, which, it is thought, left a frenzy on his mind: for his disposition totally changed, and he committed the most atrocious acts of impiety, cruelty, and folly; such as proclaiming his horse consul, feeding it at his table, introducing it to the temple in the vestments of the priests of Jupiter, &c. and causing sacrifices to be offered to himself, his wife, and the horse. After having murdered many of his subjects with his own hand, and caused others to be put to death without any just cause, he was assassinated by a tribune of the people as he came out of the amphitheatre, A. D. 41, in the 29th year of his age, and 4th of his reign.

CALIN, a compound metal, whereof the Chinese make tea-canisters, and the like. The ingredients seem to be lead and tin.

CALIPH, or KHALIF, the supreme ecclesiastical dignity among the Saracens; or, as it is otherwise defined, a sovereign dignity among the Mahometans, vested with absolute authority in all matters relating both to religion and policy. In the Arabic it signifies *successor* or *vicar*; the caliphs bearing the same relation to Mahomet that the popes pretend they do to Jesus Christ or St Peter. It is at this day one of the Grand Signior's titles, as successor of Mahomet; and of the Sophi of Persia, as successor of Ali. One of the chief functions of the caliph, in quality of imam or chief priest of Mussulmanism, was to begin the public prayers every Friday in the chief mosque, and to deliver the *khothbak* or sermon. In after-times, they had assistants for this latter office; but the former the caliphs always performed in person. The caliph was also obliged to lead the pilgrims to Mecca in person, and to march at the head of the armies of his empire. He granted investitures to princes; and sent swords, standards, gowns, and the like, as presents to princes of the Mahometan religion; who, though they had thrown off the yoke of the caliphate, nevertheless held of it as vassals. The caliphs usually went to the mosque mounted on mules; and the sultans selgiucides, though masters of Bagdad, held their stirrups, and led their mule by the bridle some distance on foot, till such time as the caliphs gave them the sign to mount on horseback. At one of the windows of the caliph's palace, there always hung a piece of black velvet 20 cubits long, which reached to the ground, and was called the *caliph's sleeve*; which the grandees of his court never failed to kiss, every day, with great respect. After the destruction of the caliphate by Hulaku *, the Mahometan princes appointed a particular officer, in their respective dominions, who sustains the sacred authority of caliph. In Turkey, he goes under the denomination of *mufiti*, and in Persia under that of *fadne*.

CALIPHATE, the office or dignity of caliph: See the preceding article. The succession of caliphs continued from the death of Mahomet till the 655th year of the Hegira, when the city of Bagdad was taken by the Tartars. After this, however, there were persons who claimed the caliphate, as pretending to be of the family of the Abbasides, and to whom the sultans of Egypt rendered great honours at Cairo, as the true

Caligula

Caliphate.

* See Bagdad, n^o 55.

Califa
||
Call.

Calla
||
Callao.

* See Bar-
bary, n^o 24.
and Turkey.

true successors of Mahomet: but this honour was merely titular, and the rights allowed them only in matters relating to religion; and though they bore the sovereign title of *caliphs*, they were nevertheless subjects and dependents of the sultans. - In the year of the Hegira 361, a kind of caliphate was erected by the Fatemites in Africa, and lasted till it was suppressed by Saladdin *. - Historians also speak of a third caliphate in Gemen or Arabia Felix, erected by some princes of the family of the Jobites. The emperors of Morocco assume the title of *grand sherifs*; and pretend to be the true caliphs, or successors of Mahomet, though under another name.

CALISTA, in fabulous history, the daughter of Lycaon king of Arcadia, and one of the nymphs of Diana; who being beloved by Jupiter, that god assumed the form of the goddess of chastity, by which means he debauched her: but her disgrace being revealed, as she was bathing with her patroness, the incensed deity turned her and the son, with which she was pregnant, into bears; when Jupiter, in compassion to her sufferings, took them up into the heavens, and made them the constellations Ursa Major and Ursa Minor.

CALIX. See CALYX.

CALIXTINS, in church-history, a sect of Christians in Bohemia and Moravia: the principal point in which they differed from the church, was the use of the chalice, or communicating in both kinds.

CALIXTINS, is also a name given to those, among the Lutherans, who follow the sentiments of George Calixtus, a celebrated divine, who opposed the opinion of St Augustine on predestination, grace, and free-will.

CALKA, a kingdom of Tartary, in Asia, to the east of Siberia.

CALKING. See CAULKING.

CALKINS, the prominent parts at the extremities of a horse-shoe, bent downwards, and forged to a sort of point.

Calkins are apt to make horses slip; they also occasion blyemes, and ruin the back sinews. If fashioned in form of a hare's ear, and the horn of a horse's heel be pared a little low, they do little damage; whereas the great square calkins quite spoil the foot.

Calkins are either single or double, that is, at one end of the shoe, or at both: these last are deemed less hurtful, as the horses can tread more even.

CALL, among hunters, a lesson blown upon the horn, to comfort the hounds.

CALL, among sailors, a sort of whistle or pipe, of silver or brass, used by the boatwain and his mates to summon the sailors to their duty, and direct them in the different employments of the ship. As the call can be founded to various strains, each of them is appropriated to some particular exercise; such as hoisting, heaving, lowering, veering away, belaying, letting go a tackle, &c. The act of winding this instrument is called *pipings*, which is as attentively observed by sailors as the beat of the drum to march, retreat, rally, charge, &c. is obeyed by soldiers.

CALL, among fowlers, the noise or cry of a bird, especially to its young, or to its mate in coupling-time. One method of catching partridges is by the natural call of a hen trained for the purpose, which drawing the cocks to her, they are entangled in a net. Different birds require different sorts of calls; but they are

most of them composed of a pipe or reed, with a little leathern bag or purse, somewhat in form of a bellows; which, by the motion given thereto, yields a noise like that of the species of bird to be taken. The call for partridges is formed like a boat bored through, and fitted with a pipe or swan's quill, &c. to be blown with the mouth, to make the noise of the cock-partridge, which is very different from the call of the hen. Calls for quails, &c. are made of a leathern pipe in shape like a pear, stuffed with horse-hair, and fitted at the end with the bone of a cat's, hare's, or coney's leg, formed like a flageolet. They are play'd, by squeezing the purse in the palm of the hand, at the same time striking on the flageolet part with the thumb, to counterfeite the call of the hen-quail.

CALLA, WAKE-ROBIN, or *Ethiopian Arum*; a genus of the polyandria order, belonging to the gynandria class of plants. Of this there is but one species. It hath thick, fleshy, tubercous roots, which are covered with a thin brown skin, and strike down many strong fleshy fibres into the ground. The leaves have footstalks more than a foot long, which are green and succulent. The leaves are shaped like the point of an arrow; they are eight or nine inches in length, ending in a sharp point, which turns backward; between the leaves arise the footstalk of the flower, which is thick, smooth, of the same colour as the leaves, rises above them, and is terminated by a single flower, shaped like those of the arum, the hood or spathe being twisted at bottom, but spreads open at the top, and is of a pure white colour. When the flowers fade, they are succeeded by roundish fleshy berries, compressed on two sides, each containing two or three seeds. This plant grows naturally at the Cape of Good Hope. It propagates very fast by offsets, which should be taken off in the latter end of August, at which time the old leaves decay; for at this time the roots are in their most inactive state. They are so hardy as to live without any cover in mild winters, if planted in a warm border and dry soil; but, with a little shelter in hard frost, they may be preserved in full growth very well.

CALLA-Sufung, a town of Asia, in the island of Bouton in the East Indies. It is seated about a mile from the sea, on the top of a small hill surrounded with coconut-trees. See BOUTON.

CALLAO, a strong town of South America, in Peru. It is the port of Lima, from which it is distant about five miles. The town is built on a low flat point of land on the sea-shore. It is fortified; but the fortifications were much damaged by the last great earthquake, and have not since been repaired. The town is not above nine or ten feet above the level of high-water mark; but the tide does not commonly rise or fall above five feet. The streets are drawn in a line; but are full of dust, which is very troublesome. In a square near the sea-side are the governor's house, the viceroy's palace, the parish-church, and a battery of three pieces of cannon. On the north side are the warehouses for the merchandise brought from Chili, Mexico, and other parts of Peru. The other churches are built with reeds, and covered with timber or clay, but they look tolerably neat. There are five monasteries and an hospital, though the number of families does not exceed 400. The trade of Callao is considerable. From Chili they bring cordage, leather, tallow, dried fish, and corn;

from

Callos
Callimachus

Calling
Callipædia.

from Chiloe, cedar-planks, woollen manufactures, and carpets; from Peru, sugars, wines, brandy, malts, cordage, timber for shipping, cacao, tobacco, and molasses; from Mexico, pitch, tar, woods for dyeing, sulphur, balsam of Peru both white and brown, as well as commodities from China. At the port of Callao the watering is easy, but the wood is a mile or two distant. Earthquakes are very frequent in these parts, which have done vast mischief to Lima and Callao. W. Long, 76. 15. S. Lat. 12. 29.

CALLE, (anc. geog.), a town of Hither Spain, situated on an eminence which hangs over the river Durus; whose port was at the mouth of the river. Now *Porto, Oporto, or Port a Port*. See *Oporto*.

CALLEN, a town of Ireland, in the county of Kilkenny and province of Leinster, about ten miles south-west of Kilkenny. W. Long, 7. 22. N. Lat. 52. 25.

CALLICARPA. See *JOHNSONIA*.

CALLICO, in commerce; a kind of cloth made of cotton, chiefly in the East Indies. Some of them are painted with various flowers of different colours: others are not stained, but have a stripe of gold and silver quite through the piece, and at each end is fixed a tulle of gold, silver, and silk, intermixed with flowers. This manufacture is brought hither by the East-India company, and is re-exported by merchants to other parts of Europe. The general wear of stained or printed India calicoes in this nation having become a general grievance, and occasioning unspeakable distress upon our own manufactures, they were prohibited by stat. 7 Geo. I. cap. vii.

CALLICRATES, an ancient sculptor, who engraved some of Homer's verses on a grain of millet, made an ivory chariot that might be concealed under the wing of a fly, and an ant of ivory in which all the members were distinct: but Ælian justly blames him for exerting his genius and talents in things so useless, and at the same time so difficult. He flourished about the year 472 before Christ.

CALLIGRAPHUS, in antiquity, a copist or scrivener, who transcribed in a fair hand what the notaries had taken down in notes or minutes, being generally in a kind of cipher or short-hand, which, as they were in that hand, being understood by few, were copied over fair, and at length, by persons who had a good hand, for sale, &c.

CALLIMACHUS, a celebrated architect, painter, and sculptor, born at Corinth, having been by accident a vessel about which the plant called *acanthus* had raised its leaves, conceived the idea of forming the Corinthian capital. (See *ACANTHUS*, and Plate XXV. (s). fig. 4.) The ancients assure us, that he worked in marble with wonderful delicacy. He flourished about 540 B. C.

CALLIMACHUS, a celebrated Greek poet, native of Cyrene in Libya, flourished under Ptolemy Philadelphus and Ptolemy Evergetes kings of Egypt, about 280 years before Christ. He passed, according to Quintilian, for the prince of the Greek elegiac poets. His style is elegant, delicate, and nervous. He wrote a great number of small poems, of which we have only some hymns and epigrams remaining. Catullus has closely imitated him, and translated into Latin verse his small poem on the locks of Berenice. Callimachus

was also a good grammarian and a learned critic. There is an edition of his remains, by Mest. le Fèvre, quarto; and another in two volumes octavo, with notes by Spanheim, Grævius, Bentley, &c.

CALLING *the House*, in the British parliament, is the calling over the members named, every one answering to his own, and going out of the house, in the order in which he is called: this they do in order to discover whether there be any persons there not returned by the clerk of the crown, or if any member be absent without leave of the house.

CALLINICUS of Heliopolis, inventor of a composition to burn in the water, called the *Greek*, and since *Wild, Fire*. See *Grecian FIRE*.

CALLINUS of Ephesus, a very ancient Greek poet, inventor of elegiac verse; some specimens of which are to be found in the collection of Stobæus. He flourished about 776 years before Christ.

CALLIONYMUS, the *DRAGONET*, in ichthyology, a genus of fishes belonging to the order of jugulares. The upper lip is doubled up; the eyes are very near each other; the membrane of the gills has six radii; the operculum is shut; the body is naked; and the belly-fins are at a great distance from each other. There are three species of callionymus, viz. 1. The *lyra*, with the first bone of the back-fin as long as the body of the animal, and a cirrus at the anus. It is found as far north as Norway and Spitzbergen, and as far south as the Mediterranean sea, and is not unfrequent on the Scarborough coasts, where it is taken by the hook in 30 or 40 fathoms water. It is often found in the stomach of the cod-fish. 2. The *dracunculus*, with the first bone of the back-fin shorter than its body, which is of a spotted yellow colour. It frequents the shores of Genoa and Rome. 3. The *indicus* has a smooth head, with longitudinal wrinkles; the lower jaw is a little longer than the upper one; the tongue is obtuse and emarginated; the apertures of the gills are large: it is of a livid colour, and the anus is in the middle of the body. It is a native of Asia.

CALLOPE, in the Pagan mythology, the muse who presides over eloquence and heroic poetry. She was thus called from the sweetness of her voice, and was reckoned the first of the nine sisters.

CALLIPÆDIA, the art of getting or breeding fine and beautiful children. We find divers rules and practices relating to this art, in ancient and modern writers. Among the magi, a sort of medicine called *ermesia* was administered to pregnant women, as a means of producing a beautiful issue. Of this kind were the kernels of pine-nuts ground with honey, myrrh, saffron, palm-wine and milk. The Jews are said to have been so solicitous about the beauty of their children, that care was taken to have some very beautiful child placed at the door of the public baths, that the women at going out being struck with his appearance, and retaining the idea, might all have children as fine as he. The Chinese take still greater care of their breeding women, to prevent uncouth objects of any kind from striking their imagination. Musicians are employed at night to entertain them with agreeable songs and odes, in which are set forth all the duties and comforts of a conjugal and domestic life; that the infant may receive good impressions even before it is born, and not only come forth agreeably formed in body,

but

Callipolis
||
Callot.

but well disposed in mind. Callipædia, nevertheless, seems to have been first erected into a just art by Claude Quillet de Chinon, a French abbot, who, under the fictitious name of *Calvidus Latus*, has published a fine Latin poem in four books, under the title of *Callipædia, seu de pulcherræ proliis habenda ratione*; wherein are contained all the precepts of that new art. There is a translation of it into English verse, by Mr Rowe.

CALLIPOLIS, (anc. geog.), the name of several cities of antiquity, particularly one upon the Hellespont, next the Propontis, and opposite to Lampacus in Asia. Now **GALLIOLI**.

CALLIPPIC PERIOD, an improvement of the cycle of Meton, of 19 years, which Callippus the Grecian astronomer, finding in reality to contain 19 of Nabonassar's years, four days, and $\frac{1}{4}$, he, to avoid fractions, quadrupled the golden number, and by that means made a new cycle of 76 years; which time being expired, he supposed the lunation, or changes of the moon, would happen on the same day of the month and hour of the day that they were on 76 years before.

CALLIPPUS, a celebrated Athenian astronomer, and the first observer of the revolutions of eclipses, flourished 336 years before Christ.

CALLIRHOE, (anc. geog.), surnamed *Enneacrunos*, from its nine springs or channels; a fountain not far from Athens, greatly adorned by Pisistratus, where there were several wells, but this only the running spring. Callirhoe was also the name of a very fine spring of hot water beyond Jordan near the Dead Sea, into which it empties itself.

CALLISTEA, in Grecian antiquity, a Lesbian festival, wherein the women presented themselves in Juno's temple, and the prize was assigned to the fairest. There was another of these contentions at the festival of Ceres Eleusinia among the Parrhasians, and another among the Eleans, where the most beautiful man was presented with a complete suit of armour, which he consecrated to Minerva, to whose temple he walked in procession, being accompanied by his friends, who adorned him with ribbons, and crowned him with a garland of myrtle.

CALLISTHENES the philosopher, disciple and relation of Aristotle, by whose desire he accompanied Alexander the Great in his expeditions; but proving too severe a censor of that hero's conduct, he was put by him to the torture (on suspicion of a treasonable conspiracy), and died under it, 328 years before Christ.

CALLISTRATUS, an excellent Athenian orator, was banished for having obtained too great an authority in the government. Demosthenes was so struck with the force of his eloquence, and the glory it procured him, that he abandoned Plato, and resolved from thenceforward to apply himself to oratory.

CALLOO, a fortress in the Netherlands, in the territory of Waes, on the river Scheld, subject to the house of Austria. The Dutch were defeated here by the Spaniards in 1638. E. Long. 4. 10. N. Lat. 51. 15.

CALLOSUM CORPUS, in anatomy, a whitish hard substance, joining the two hemispheres of the brain, and appearing in view when the two hemispheres are drawn back. See **ANATOMY**, n^o 397.

CALLOT (James), a celebrated engraver born at Nancy in 1593. In his youth he travelled to Rome to learn designing and engraving; and from thence went

Callot
||
Calmet.

to Florence, where the grand duke took him into his service. After the death of that prince, Callot returned to his native country; when he was very favourably received by Henry duke of Lorraine, who settled a considerable pension upon him. His reputation being soon after spread all over Europe, the infants of the Netherlands drew him to Brussels, where he engraved the siege of Breda. Lewis XIII. made him design the siege of Rochelle, and that of the isle of Rhe. The French king, having taken Nancy in 1631, made Callot the propofal of representing that new conquest, as he had already done the taking of Rochelle: but Callot begged to be excused; and, some courtiers resolving to oblige him to do it, he answered, that he would sooner cut off his thumb than do any thing against the honour of his prince and country. This excuse the king accepted; and said, that the duke of Lorraine was happy in having such faithful and affectionate subjects. Callot followed his business so closely, that, though he died at 43 years of age, he is said to have left 1380 pieces of his own execution. Mr Evelyn, in his *Sculptura*, gives him a very exalted character in his art.

CALLUS, or **CALLOSTY**, in a general sense, any cutaneous, corneous, or osseous hardness, whether natural or preternatural; but most frequently it means the callus generated about the edges of a fracture, provided by nature to preserve the fractured bones, or divided parts, in the situation in which they are replaced by the surgeon. A callus, in this last sense, is a sort of jelly, or liquid viscous matter, that sweats out from the small arteries and bony fibres of the divided parts, and fills up the chinks or cavities between them. It first appears of a cartilaginous substance; but at length becomes quite bony, and joins the fractured part so firmly together, that the limb will often make greater resistance to any external violence with this part, than with those which were never broken.

CALLUS is also a hard, dense, insensible knob, rising on the hands, feet, &c. by much friction and pressure against hard bodies.

CALM, the state of rest which appears in the air and sea when there is no wind stirring. That tract of the Atlantic ocean situated between the tropic of Cancer and the latitude of 29° north, or the space that lies between the trade and the variable winds, is frequently subject to calms of very long duration; and hence it has acquired amongst seamen the name of the *calm latitudes*.

CALMAR, a strong sea-port of Sweden, in the province of Smaland, divided into two towns, the old and the new; but of the former there remains only the church and a few houses. The new town is built a little way from the other, and has large handsome houses. E. Long. 16. 15. N. Lat. 56. 40.

CALMET (Augustine), one of the most learned and laborious writers of the 18th century, was born at Mefnil le Horgne, a village in the diocese of Toul in France, in the year 1672, and took the habit of the Benedictines in 1688. Among the many works he published, are, 1. A literal exposition, in French, of all the books in the Old Testament, in nine volumes folio.

2. A historical, critical, chronological, geographical, and literal, dictionary of the Bible, in four vols folio, enriched with a great number of figures of Jewish antiquities. 3. A civil and ecclesiastical history of Lorraine, three vols folio.

Calmucks
|
Caltha.

Caltrop
|
Calvert.

folio. 4. A history of the Old and New Testament, and of the Jews, in two volumes folio, and seven vols duodecimo. 5. An universal sacred and profane history, in several volumes quarto. He died in 1757.

CALMUCKS. See KALMUCKS.

CALNE, a town of Wiltshire in England, seated on a river of the same name. It has a handsome church, and sends two members to parliament. W. Long. 1. 59. N. Lat. 51. 30.

CALOGERI, in church-history, monks of the Greek church, divided into three degrees: the novices, called *archari*; the ordinary professed, called *nichrochemi*; and the more perfect, called *mogulochemi*: they are likewise divided into cœnobites, anchorites, and recluses. The cœnobites are employed in reciting their offices from midnight to sun-set; they are obliged to make three genuflexions at the door of the choir, and, returning, to bow to the right and to the left, to their brethren. The anchorites retire from the conversation of the world, and live in hermitages in the neighbourhood of the monasteries; they cultivate a little plot of ground, and never go out but on Sundays and holidays to perform their devotions at the next monastery. As for the recluses, they shut themselves up in grottos and caverns on the tops of mountains, which they never go out of, abandoning themselves entirely to Providence: they live on the alms sent them by the neighbouring monasteries.

CALOMEL, or dulcified sublimate of mercury. See PHARMACY, n^o 760—763.

CALOTTE, a cap or coif of hair, fatten, or other stuff; an ecclesiastical ornament in most Popish countries. See CAP.

CALOTTE, in architecture, a round cavity or depression, in form of a cap or cup, lathed and plastered, used to diminish the rise or elevation of a moderate chapel, cabinet, alcove, &c. which, without such an expedient, would be too high for other pieces of the apartment.

CALPE, a mountain of Andalusia in Spain; at the foot of which, towards the sea, stands the town of Gibraltar. It is half a league in height towards the land, and so steep that there is no approaching it on that side.

CALPURNIUS (Titus), a Latin Sicilian poet, lived under the emperor Carus and his son. We have seven of his eclogues remaining.

CALQUING, or CALKING, a term used in painting, &c. where the back-side of any thing is covered over with a black or red colour, and the strokes or lines traced through, on a waxed plate, wall, or other matter, by passing lightly over each stroke of the design with a point, which leaves an impression of the colour on the plate or wall.

CALTHA, MARSH-MARIGOLD; a genus of the digynia order, belonging to the polyandria class of plants. There is only one species known, which grows naturally in moist boggy lands in many parts of England and Scotland. There is a variety, with very double flowers, which for its beauty is preserved in gardens. It is propagated by parting the roots in autumn. It should be planted in a moist soil and shady situation; and as there are often such places in gardens where few other plants will thrive, so these may be allowed room, and during their season of flowering will afford

an agreeable variety. The flowers gathered before they expand, and preserved in salted vinegar, are a good substitute for capers. The juice of the petals, boiled with a little alum, stains paper yellow. The remarkable yellowness of the butter in spring is supposed to be caused by this plant: but cows will not eat it, unless compelled by extreme hunger; and then, Boerhaave says, it occasions such an inflammation, that they generally die. Upon May-day, the country people threw the flowers upon the pavement before their doors. Goats and sheep eat this plant; horses, cows, and swine, refuse it.

CALTROP, in botany. See TRIBULUS.

CALTROP, in military affairs, an instrument with four iron points, disposed in a triangular form, so that three of them are always on the ground, and the fourth in the air. They are scattered over the ground where the enemy's cavalry is to pass, in order to embarrass them.

CALVARIA, in anatomy, the hairy scalp or upper part of the head, which, either by disease or old age, grows bald first.

CALVART (Denis), a celebrated painter, was born at Antwerp in 1552; and had for his masters Prospero Fontana and Lorenzo Sabbatini. He opened a school at Bologna, which became celebrated; and from which proceeded Guido, Albani, and other great masters. Calvart was well skilled in architecture, perspective, and anatomy, which he considered as necessary to a painter, and taught them to his pupils. His principal works are at Bologna, Rome, and Reggio. He died at Bologna in 1619.

CALVARY, a term used in Catholic countries for a kind of chapel of devotion raised on a hillock near a city, in memory of the place where Jesus Christ was crucified near the city of Jerusalem. The word comes from the Latin *calvarium*; and that from *calvus*, bald; in regard the top of that hillock was bare and destitute of verdure: which is also signified by the Hebrew word *golgotha*. Such is the Calvary of St Valerian near Paris; which is accompanied with several little chapels, in each of which is represented in sculpture one of the mysteries of the passion.

CALVARY, in heraldry, a cross so called, because it resembles the cross on which our Saviour suffered. It is always set upon steps.

CALVERT (George), afterwards lord Baltimore, was born at Kipling in Yorkshire about the year 1582, and educated at Oxford, where he took the degree of bachelor of arts, and afterwards travelled. At his return, he was made secretary to Sir Robert Cecil: he was afterwards knighted, and in 1618 appointed one of the principal secretaries of state. But after he had enjoyed that post about five years, he willingly resigned it; freely owning to his majesty that he was become a Roman-catholic, so that he must either be wanting to his trust, or violate his conscience in discharging his office. This ingenious confession so affected king James, that he continued him privy-counsellor all his reign, and the same year created him baron of Baltimore in the kingdom of Ireland. He had before obtained a patent for him and his heirs, for the province of Avelon in Newfoundland; but that being exposed to the insults of the French, he abandoned it, and afterwards obtained the grant of a country on the north part of Virginia from Charles I. who called it *Maryland*, in honour of his queen:

Calvi,
Calvin.

queen: but he died in April 1632 (aged 50), before the patent was made out. It was, however, filled up to his son Cecil Calvert lord Baltimore; and bears date June 20th 1632. It is held from the crown as part of the manor of Windfor, on one very singular condition, viz. to present two Indian arrows yearly, on Easter Tuesday, at the castle, where they are kept and shewn to visitors.—His lordship wrote, 1. A Latin poem on the death of Sir Henry Upton. 2. Speeches in parliament. 3. Various letters of state. 4. The answer of Tom Tell-truth. 5. The practice of princes. And, 6. The lamentation of the kirk.

CALVI, a town of the province of Lavoro, in the kingdom of Naples, situated near the sea, about fifteen miles north of the city of Naples. E. Long. 14. 45. N. Lat. 41. 15.

CALVI is also the name of a sea-port in the island of Corfica, situated on a bay, on the west side of the island, about 40 miles south-west of Baffia. E. Long. 9. 5. N. Lat. 42. 16.

CALVIN (John), the celebrated reformer of the Christian church from Romish superstitions and doctrinal errors, and founder of the sect since called *Calvinists*, was born in 1509. He was the son of a cooper of Noyon in Picardy; and his real name was *Chauvin*, which he chose to latinize into *Calvinus*, tyling himself in the title-page to his first work, (a Commentary on *Seneca de clementia*), “*Lucius Calvinus, Civis Romanus*,” an early proof of his pride, at about 24 years of age. In 1529, he was rector of Pont l’Eveque; and in 1534 he threw up this benefice, separating himself entirely from the Romish church. The persecution against the Protestants in France (with whom he was now associated) obliged him to retire to Basle in Switzerland: here he published his famous Institutes of the Christian religion in 1535. The following year, he was chosen professor of divinity, and one of the ministers of the church, at Geneva. The next year, viz. 1537, he made all the people solemnly swear to a body of doctrines; but finding that religion had not yet had any great influence on the morals of the people, he, assisted by other ministers, declared, that since all their admonitions and warnings had proved unsuccessful, they could not celebrate the holy sacrament as long as these disorders reigned; he also declared, that he could not submit to some regulations made by the synod of Berne. Upon which the Syndics having summoned the people, it was ordered that Calvin and two other ministers should leave the city within two days. Upon this, Calvin retired to Strasburg, where he established a French church, of which he was the first minister, and was also chosen professor of divinity there. Two years after, he was chosen to assist at the diet appointed by the emperor to meet at Worms and at Ratibon in order to appease the troubles occasioned by the difference of religion. He went with Bucer, and entered into a conference with Melancthon. The people of Geneva now intreated him to return; to which he consented, and arrived at Geneva, Sept^r 13th 1541. He began with establishing a form of ecclesiastical discipline, and a consistorial jurisdiction, with the power of inflicting all kinds of canonical punishments. This was greatly disliked by many persons, who imagined that the papal tyranny would soon be revived. Calvin, however, asserted on all occasions the rights of his consistory with

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inflexible strictness; and he caused Michael Servetus to be burnt at the stake for writing against the doctrine of the Trinity. But though the rigour of his proceedings sometimes occasioned great tumults in the city, yet nothing could shake his steadiness and inflexibility. Amongst all the disturbances of the commonwealth, he took care of the foreign churches in England, France, Germany, and in Poland; and did more by his pen than his presence, sending his advice and instructions by letter, and writing a great number of books. This great reformer died on the 27th of May 1564, aged 55. His works were printed together at Amsterdam in 1671, in nine volumes folio: the principal of which are his Institutes, in Latin, the best edition of which is that of Robert Stephens in 1553, in folio; and his Commentaries on the Holy Scriptures.—Calvin is universally allowed to have had great talents, an excellent genius, and profound learning. His style is grave and polite. Independent of his spiritual pride, his morals were exemplary; for he was pious, sober, chaste, laborious, and disinterested. But his memory can never be purified from the stain of burning Servetus: it ill became a reformer to adopt the most odious practice of the corrupt church of Rome.

CALVINISTS, in church-history, those who follow the opinions of CALVIN; whose doctrine still subsists in its greatest purity at Geneva, where it was first broached, and from whence it was propagated. This is the prevailing religion of the United Provinces. In England, it is confined among the dissenters; and in Scotland it is the only orthodox faith.

The Calvinists are great advocates for the absoluteness of God’s decrees; and hold, that election and reprobation depend on the mere will of God, without any regard to the merit or demerit of mankind; that he affords to the elect an irresistible grace, a faith that they cannot lose, which takes away the freedom of will, and necessitates all their actions to virtue.

The Calvinists believe that God foreknew a determinate number, whom he pitched upon to be persons in whom he would manifest his glory; and that, having thus foreknown them, he predestinated them to be holy, in order to which he gives them an irresistible grace, which makes it impossible for them to be otherwise.

CALVISIUS (Seth), a celebrated German chronologer in the beginning of the 17th century. He wrote *Elenchus calendarii Gregoriani, et duplex calendarii melioris forma*, and other learned works, together with some excellent treatises on music.

CALVITIES, or CALVITIUM, in medicine, baldness, or a want of hair, particularly on the scalp, occasioned by the moisture of the head, which should feed it, being dried up, by some disease, old age, or the immoderate use of powder, &c. See ALOPECIA.

CALUMET, a symbol of peace among the Indians, in the north of America. It is made of a red stone, like our marble: the head resembles our tobacco-pipes, but larger; and is fixed on a hollow reed, to hold it for smoking: they adorn it with fine wings of several colours, and is the calumet of the sun, to whom they present it, especially if they want fair weather, or rain. This pipe is a pass and safe conduct amongst all the allies of the nation who has given it: in all embassies the ambassador carries it as an emblem of peace, and it always meets with a profound regard; for the savages

Calvinists
||
Calumet.

Calumny
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Calydon.

are generally persuaded, that a great misfortune would befall them, if they violated the public faith of the calumnet.

CALUMNY, the crime of accusing another falsely, and knowingly so, of some heinous offence.

Oath of Calumny, Juramentum (or rather *Jurjurandum*) *Calumnie*, among civilians and canonists, was an oath which both parties in a cause were obliged to take; the plaintiff that he did not bring his charge, and the defendant that he did not deny it, with a design to abuse each other, but because they believed their cause was just and good; that they would not deny the truth, nor create unnecessary delays, nor offer the judge or evidence any gifts or bribes. If the plaintiff refused this oath, the complaint or libel was dismissed; if the defendant, it was taken *pro confesso*. This custom was taken from the ancient athlete; who, before they engaged, were to swear that they had no malice, nor would use any unfair means for overcoming each other. The *juramentum calumnie* is much disused, as a great occasion of perjury. Anciently the advocates and proctors also took this oath; but of late it is dispensed with, and thought sufficient that they take it once for all at their first admission to practice *.

CALVUS (Cornelius Licinius), a celebrated Roman orator, was the friend of Catullus; and flourished 64 B. C. Catullus, Ovid, and Horace, speak of him.

CALX properly signifies *lime*, but is also used by chemists and physicians for a fine powder remaining after the calcination or corrosion of metals and other mineral substances. All metallic calces, at least all those made by fire, are found to weigh more than the metal from which they were originally produced: for a full explication of this phenomenon, see the article **FIRE**.

CALX Antimonii. See **PHARMACY**, n° 773.

CALX Nativa, in natural history, a kind of marly earth, of a dead whitish colour, which, if thrown into water, makes a considerable bubbling and hissing noise, and has, without previous burning, the quality of making a cement like lime or plaster of Paris.

CALX Viva, or *Quick-lime*, that whereon no water has been cast, in contradistinction to lime which has been slaked by pouring water on it. See **CHEMISTRY**, n° 34.

CALYCANTHEMÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which are the following genera, viz. epilobium, crenothera, justicia, ludwigia, oldenlandia, isinardas, &c. See **BOTANY**, sect. vi. 17.

CALYCIFLORÆ, in botany, the 16th order in Linnæus's *Fragmenta methodi naturalis*, consisting of plants which, as the title imports, have the stamina (the flower) inserted into the calyx. This order contains the following genera, viz. cleagnus, hippophae, ostrya, and trophis. See **BOTANY**, sect. vi. 16.

CALYCISTÆ, (from *calyx* the flower-cup), systematic botanists, so termed by Linnæus, who have arranged all vegetables from the different species, structure, and other circumstances, of the calyx or flower-cup. The only systems of this kind are the *Character plantarum novus*, a posthumous work of Magnolius, professor of botany at Montpellier, published in 1720; and Linnæus's *Methodus calycina*, published in his *Classes plantarum*, at Leyden, in 1738. See **BOTANY**, p. 1290.

CALYDON, (anc. geog.), a town of Ætolia, situated seven miles and a half from the sea, and divided

by the river Evenus: the country was anciently called *Æolia*, from the Æolians its inhabitants. This country was famous for the story of Meleager and the Calydonian boar.

CALYPSO, in fabulous history, a goddess, who was the daughter of Oceanus and Tethys, or, as others say, of Atlas. She was queen of the island of Ogygia, which from her was called the island of *Calypsø*. According to Homer, Ulysses suffered shipwreck on her coast, and staid with her several years.

CALYPTRA, among botanists, a thin membranaceous involucre, usually of a conic figure, which covers the parts of fructification. The capsules of most of the mosses have calyptræ.

CALYX, among botanists, a general term expressing the cup of a flower, or that part of a plant which surrounds and supports the other parts of the flower.

The cups of flowers are very various in their structure, and on that account distinguished by several names, as *perianthium*, *involucreum*, *spatha*, *gluma*, &c. *

CALZADA, a town of Old Castile in Spain, seated on the river Leglera. W. Long. 2. 47. N. Lat. 42. 12.

CAMEÆA, in natural history, a genus of the semipellucid gems, approaching to the onyx structure, being composed of zones, and formed on a crystalline basis; but having their zones very broad and thick, and laid alternately one on another, with no common matter between; usually less transparent, and more debased with earth, than the onyxes.

1. One species of the cameæa is the dull-looking onyx, with broad black and white zones; and is the cameæa of the moderns, and the Arabian onyx. This species is found in Egypt, Arabia, Persia, and the East Indies. 2. Another species of the cameæa is the dull, broad-zoned, green and white cameæa, or the jaspinecameo of the Italians: it is found in the East Indies, and in some parts of America. 3. The third is the hard cameæa, with broad white and chestnut-coloured veins. 4. The hard cameæa, with bluish, white, and flesh-coloured broad veins, being the sardonnyx of Pliny's time, only brought from the East Indies.

CAMAIËU, or **CAMAYEU**, a stone whereon are found various figures and representations of landscapes, formed by a kind of lusus nature, so as to exhibit pictures without painting. The word comes from *camebula*, a name the orientals give to the onyx, when they find, in preparing it, another colour; as who should say, *a second stone*. The Latins call it *cameus*; the Italians, *cameo*. It is of these camaiæux that Pliny is to be understood, when he speaks of the manifold picture of gems, and the party-coloured spots of precious stones *.

CAMALDULIANÆ, a religious order founded by St Romauld, in a little plain on the mount Apennine, called *Camaldolia*, situated in the state of Florence.

The manner of life first enjoined this order was, that they dwelt in separate cells, and met together only at the time of prayer: some of them, during the two lasts of the year, observed an inviolable silence; and others, for the space of an hundred days. On Sundays and Thursdays they fed on herbs, and the rest of the week only on bread and water. These constitutions were, however, a little moderated some time afterwards. This hermitage is now accounted very rich.

CAMARANA, an island of Arabia, in the Red Sea, whose inhabitants are little and black. It is the best

Calypsø
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Camarana.

* See Botany,
p. 1293,
1294.

* See the article *Agate*.

* See also
Law,
Part III.
p. 11.

Camsyen
Cambodia.

best of all the islands in this sea, and here they fish for coral and pearls. N. Lat. 15. 0.

CAMAYEU. See CAMAIEU.

CAMBAIA, or CAMPAY, a town of Asia, in India, and in the peninsula on this side the Ganges; capital of a province of the same name; but more commonly called *Guzarat*. It is seated at the bottom of a gulph of the same name, on a small river; is a large place with high walls, and has a pretty good trade. The product and manufactures are inferior to few towns in India: for it abounds in corn, cattle, and silk; and cornelian and agate stones are found in its rivers. The inhabitants are noted for embroidery; and some of their quilts have been valued at 40*l*. It is subject to the Great Mogul. E. Long. 72. 15. N. Lat. 22. 30.

CAMBER, according to our monkish historians, one of the three sons of Brutus, who, upon his father's death, had that part of Britain assigned him for his share, called from him *Cambria*, now *Wales*.

CAMBER-Beam, among builders, a piece of timber in an edifice cut archwise, or with an obtuse angle in the middle, commonly used in platforms, as church-leads, and on other occasions where long and strong beams are required.

CAMBERED-DECKS, among ship-builders. The deck or flooring of a ship is said to be cambered, or to lie cambering, when it is higher in the middle of the ship's length, and droops toward the stem and stern, or the two ends. Also when it lies irregular; a circumstance which renders the ship very unfit for war.

CAMBERT, a French musician in the 17th century, was at first admired for the manner in which he touched the organ, and became superintendant of the music to Anne of Austria the queen-mother. The abbe Perrin associated him in the privilege he obtained of his majesty, of setting up an opera in 1669. Cambert set to music two pastorals, one entitled *Pomona*, the other *Ariadne*, which were the first operas given in France. He also wrote a piece entitled *The pains and pleasures of love*. These pieces pleased the public; yet, in 1672, Lully obtaining the privilege of the opera, Cambert was obliged to come to England, where he became superintendant of the music to king Charles II. and died there in 1677.

CAMBLET, or CAMLET, a plain stuff composed of a warp and a woof, which is manufactured on a loom with two treddles, as linens and flannels are.

There are camblets of several sorts: some of goat's hair, both in the warp and woof; others in which the warp is of hair, and the woof half hair and half silk; others again in which both the warp and the woof are of wool; and, lastly, some in which the warp is of wool, and the woof of thread. Some are dyed in thread, others in the piece, others are marked and mixed; some are striped, some waved or watered, and some figured.

Camblets are proper for several uses, according to their different kinds or qualities: some serve to make garments both for men and women; some for bed-curtains; others for household furniture, &c.

CAMBODIA, a kingdom of Asia, in the East Indies, bounded on the north by the kingdom of Laos, on the east by Cochin-China and Chiapa, and on the south and west by the gulph and kingdom of Siam; divided by a large river called *Mecon*. The capital town is of the same name, seated on the western shore

of the said river, about 150 miles north of its mouth. This country is annually overflowed in the rainy season, between June and October; and its productions and fruits are much the same with those usually found between the tropics. E. Long. 104. 15. N. Lat. 12. 40.

CAMBRAY, an archiepiscopal city, the capital of the Cambrisis, in the Low Countries, seated on the Scheld. It is defended by good fortifications, and has a fort on the side of the river; and as the land is low on that side, they can lay the adjacent parts under water, by means of sluices. Its ditches are large and deep, and those of the citadel are cut into a rock. Clodion became master of Cambray in 445. The Danes burnt it afterwards; since which time it became a free imperial city. It has been the subject of contest between the emperors, the kings of France, and the earls of Flanders. Francis I. let it remain neutral during the war with Charles V. but this last took possession of it in 1543. After this it was given to John of Montluc by Henry III. of France, whom he created prince of Cambray; but the Spaniards took it from Montluc in 1593, which broke his heart. It continued under the dominion of the House of Austria till 1677, when the king of France became master of it, in whose hands it has continued ever since.

The buildings of Cambray are tolerably handsome, and the streets fine and spacious. The place or square for arms is of an extraordinary largeness, and capable of receiving the whole garrison in order of battle. The cathedral dedicated to the Virgin Mary is one of the finest in Europe. The body of the church is very large, and there are rich chapels, the pillars of which are adorned with marble tombs, that are of exquisite workmanship, and add greatly to the beauty of the place. There are two galleries, one of which is of copper, finely wrought. The door of the choir is of the same metal, and well carved. The steeple of this church is very high, and built in the form of a pyramid; and from its top you have a view of the city, which is one of the finest and most agreeable in the Low Countries. There are nine parishes, four abbeys, and several convents for both sexes. The citadel is very advantageously situated on high ground, and commands the whole city. Cambray is one of the most opulent and commercial cities in the Low Countries; and makes every year a great number of pieces of cambric, with which the inhabitants drive a great trade. E. Long. 3. 20. N. Lat. 50. 11.

CAMBRAY (M. de Fencelon, archbishop of). See FENELON.

CAMBRESIS, a province of France, in the Netherlands, about 25 miles in length. It is bounded on the north and east by Hainhalt, on the south by Picardy, and on the west by Artois. It is a very fertile and populous country; and the inhabitants are industrious, active, and ingenious. The trade consists principally in corn, sheep, very fine wool, and fine linen cloth. Cambray is the capital town.

CAMBRIA, a name for the principality of Wales. † See CAMBERY, and Waleis.

CAMBRIDGE, a town of England, and capital of the county of that name. It takes the name of Cambridge from the bridge over the Cam, which divides the town into two parts. Either it or a place

Cambridge. In the neighbourhood was styled *Camboritum*, in the time of the Romans. It suffered much during the wars with the Danes. Here was a castle built by William the conqueror, of which the gatehouse yet remains, and is now the county goal. By Doomsday-book it

appears, that it then had ten wards, containing 387 houses. In William Rufus's reign it was quite destroyed by Roger de Montgomery; but Henry I. bestowed many privileges upon it, particularly an exemption from the power of the sheriff, on condition of its paying yearly into the exchequer 100 merks (equivalent to 1000 pounds now), and from tolls, lassage, pontage, passage, and stallage, in all fairs of his dominions. There is a ditch still called the *king's ditch*, made by Henry III. during the barons wars, to secure it against the rebels in the Isle of Ely. In the rebellion of Wat Tyler and Jack Straw, in the reign of Richard II. the university records were burnt. The place now called the *Fenury* was formerly inhabited by Jews. The glory of Cambridge is its university; but when it had its beginning, is uncertain. At first there was no public provision for the accommodation or maintenance of the scholars; but afterwards inns began to be erected by pious persons for their reception, and in the time of Edward I. colleges began to be built and endowed.

The university enjoys great privileges; and is governed by the chancellor, who is always some nobleman, and may be changed every three years, and has a commissary under him; the high steward, chosen by the senate; the vice-chancellor, chosen by the whole body of the university, out of two named by the heads of the colleges; two proctors chosen every year; two taxers, who, with the proctors, regulate the weights and measures. The other officers are, a register, or keeper of the archives, three esquire-beadles, one yeoman-beadle, and a library-keeper. Each college has its schools and library, as at Oxford, of which those of Trinity and St John are the most considerable. King George I. purchased for 1000 l. the library of Dr Moor bishop of Ely, consisting of 30,000 volumes, and made a present of it to the university, which, out of gratitude, erected, in 1739, a fine marble statue of that prince in the senate-hall of king's-college. A professor of modern languages and history was also established here at Oxford, with a salary of 400 l. for himself and two to teach under him, by king George I. in 1724. In 1728, a professorship for natural philosophy was erected by Dr Woodward, a professor at Gresham college London, with a salary of 150 l. a-year. The same gentleman left them also his collection of fossils, and a part of his library. The master and fellows of Catherine-hall are trustees of an hospital for the cure of poor diseased people gratis; for the building and furnishing of which, Dr Addenbroke left 4000 l. Each college has its chapel for worship; but public sermons are preached at St Mary's church. The following are the most remarkable structures: 1. The chapel of king's-college, which for its contrivance and extent, fine carved work in wood and stone, and painted windows, is hardly to be equalled in the world. It is entirely of free stone, roof and all, without one pillar to support it. 2. Trinity-college and library, wonderful both for the design and execution. We must not omit to observe, that a fellowship was founded at Magdalen-college, called the *travelling Norfolk fellow-*

ship, because it is appropriated to gentlemen of that country. Any person that is qualified, may borrow whatever book he has occasion for from the libraries at Cambridge; and any one that is qualified may study in those of Oxford. The privilege of sending members to parliament was first granted to the university by James I. The town is governed by a mayor, high-steward, recorder, 13 aldermen, of whom the mayor is one, 24 common council men, a town clerk, and other inferior officers. The mayor, when he enters on his office, takes an oath to maintain the privileges of the university. The town has 14 parish-churches, and is pretty large; but the situation is low and dirty. E. Long. o. 7. N. Lat. 52. 15.

CAMBRIDGESHIRE, a county of England, bounded on the east by Norfolk, on the south by Essex and Hertfordshire, on the west by Bedfordshire and Huntingdonshire, and on the north by Lincolnshire. It is about 40 miles long, 25 broad, and 130 in circumference. It lies in the diocese of Ely; and sends six members to parliament, two for the county, two for the university, and two for the town of Cambridge. The air is very different in different parts of the county. In the fens it is moist and foggy, and therefore not so wholesome; but in the south and east parts it is very good, these being much drier than the other: but both, by late improvements, have been rendered very fruitful, the former by draining, and the latter by cinquefoil; so that it produces plenty of corn, especially barley, saffron, and hemp, and affords the richest pastures. The rivers abound with fish, and the fens with wild fowl. The principal manufactures of the county are malt, paper, and baskets. The chief rivers are the Ouse, which divides the county into two parts, and is navigable from Cambridge to Lynn in Norfolk; the Cam, which in the British signifies *crooked*, to denote its winding; the Welland, the Glenc, the Witham, and that called *Peterborough river*, which is navigable to that city from Wisbech. The fens called *Bedford level* consist of about 300,000 acres of marshy ground, lying in Cambridgeshire, Norfolk, Suffolk, Huntingdonshire, Northamptonshire, and Lincolnshire, and surrounded on all hands, except towards the sea, with high lands. As it appears to have been dry land formerly, the great change it has undergone must have been owing either to a violent breach and inundation of the sea, or to earthquakes. As the towns in and about the fens were great sufferers by the stagnation of the waters in summer, and want of provisions in winter, many attempts were made to drain them, but without success, until the time of Charles I. in which, and that of his son, the work was happily completed, and an act of parliament passed, by which a corporation was established for its preservation and government. By the same act, 83,000 acres were vested in the corporation, and 10,000 in the king. In these fens are a great many decoys, in which incredible numbers of ducks, and other wild fowl, are caught during the season.

New CAMBRIDGE, a town of New England about three miles from Boston, remarkable for an university consisting of three colleges. W. Long. 70. 4. N. Lat. 42. o.

CAMBYSES. See *(History of)* PERSIA.

CAMCHATKA. See KAMCHATKA.

CAMDEN (William), the great antiquarian, was born

Cambridge-shire
||
Camden.

Camden.

born in London in the year 1551. His father was a native of Litchfield in Staffordshire, who settling in London, became a member of the company of painters-stainers, and lived in the Old Bailey. His mother was of the ancient family of Curwen, of Wirkington in Cumberland. He was educated first at Christ's hospital, and afterwards at St Paul's school: from thence he was sent, in 1566, to Oxford, and entered servitor of Magdalen college; but being disappointed of a demy's place, he removed to Broad-gate hall, and somewhat more than two years after, to Christ-church, where he was supported by his kind friend and patron Dr Thornton. About this time he was a candidate for a fellowship of All-Souls college, but lost it by the intrigues of the Popish party. In 1570, he supplicated the regents of the university to be admitted bachelor of arts; but in this also he miscarried. The following year Mr Camden came to London, where he prosecuted his favourite study of antiquity, under the patronage of Dr Goodman, dean of Westminster, by whose interest he was made second master of Westminster school in 1575. From the time of his leaving the university to this period, he took several journeys to different parts of England, with a view to make observations and collect materials for his *Britannia*, in which he was now deeply engaged. In 1581 he became intimately acquainted with the learned president Briffon, who was then in England; and, in 1586, he published the first edition of his *Britannia*. In 1593, he succeeded to the head mastership of Westminster school on the resignation of Dr Grant. In 1597 he published his Greek grammar, and the same year was made Clarenceux king at arms. In the year 1600 Mr Camden made a tour to the north, as far as Carlisle, accompanied by his friend Mr (afterwards Sir Robert) Cotton. In 1606 began his correspondence with the celebrated president de Thou, which continued to the death of that faithful historian. In the following year he published his last edition of the *Britannia*, which is that from which the several English translations have been made; and in 1608, he began to digest his materials for a history of the reign of queen Elizabeth. In 1609, after recovering from a dangerous illness, he retired to Chislehurst in Kent, where he continued to spend the summer-months during the remainder of his life. The first part of his annals of the queen did not appear till the year 1615, and he determined that the second volume should not appear till after his death (A). The work was entirely finished in 1617; and from that time he was principally employed in collecting more materials for the further improvement of his *Britannia*. In 1622, being now upwards of 70, and finding his health decline apace, he determined to lose no time in executing his design of founding an history-lecture in the university of Oxford. His deed of gift was accordingly transmitted by his friend Mr Heather, to Mr Gregory Wheare, who was, by himself, appointed his first professor. He died at Chislehurst, in 1623, in the 73^d year of his age; and was buried with great solemnity

in Westminster-abbey in the south aisle, where a monument of white marble was erected to his memory. Camden was a man of singular modesty and integrity; profoundly learned in the history and antiquities of this kingdom, and a judicious and conscientious historian. He was revered and esteemed by the literati of all nations, and will be ever remembered as an honour to the age and country wherein he lived. Besides the works already mentioned, he was author of an excellent Greek grammar, and of several tracts in Hearne's collection.

CAMEL, in zoology. See CAMELUS.

CAMELFORD, a borough town of Cornwall in England, consisting of about 100 houses badly built; but the streets are broad and well paved. W. Long. 5. 4. N. Lat. 50. 40. It sends two members to parliament.

CAMELOPARDALIS, in zoology, the trivial name of a species of CERVUS.

CAMELUS, or CAMEL, in zoology, a genus of quadrupeds belonging to the order of pecora. The characters of the camel are these. It has no horns; it has six fore-teeth in the under jaw; the laniarii are wide set, three in the upper, and two in the lower jaw; and there is a fissure in the upper lip, resembling a cleft in the lip of a hare. The species are,

I. The DROMEDARIUS, or African camel, with one P.L.XXVIII. bunch or protuberance on the back. It has four callous fig. 2. protuberances on the fore-legs, and two on the hind ones. The hoof, or rather callous skin, of their feet, which is softer than the hoofs of other animals, enables the camel to walk along the sandy paths of warm climates with greater ease; as, by yielding to the pressure, it is not so subject to be injured by friction. The structure and constitution of these creatures is admirably adapted to the climate which produces them. In Africa and Arabia, where this animal is most frequent, and is employed in carrying all kinds of burdens, there is great scarcity of water. The camel has often been observed to travel longer than any other creature without drink. This it is enabled to do from a singular construction in its stomach. It is one of the ruminating animals, and has four stomachs. At the top of the second stomach there are several square holes, which are the orifices of about 20 cavities or sacks placed between the two membranes which compose the substance of this stomach. These sacks are so many reservoirs which they fill over and above what satisfies their present thirst, and serve for supplying them with water in long journeys thro' the dry and sandy deserts, where wells and rivers are seldom to be met with. Travellers, when much oppressed with drought, are sometimes obliged to kill their camels, in order to have a supply of drink from these reservoirs. By the above means camels are enabled to pass over unwatered tracts for seven or eight days, without requiring the least liquid; Leo Africanus says for 15. They can discover water by their scent at half a league's distance; and after a long abstinence will hasten towards it, long before their drivers perceive where it lies. Their patience

(A) The reign of queen Elizabeth was so recent when the first volume of the annals was published, that many of the persons concerned, or their dependents, were still living. It was no wonder, therefore, that the honest historian should offend those whose actions would not bear inquiry. Some of his enemies were clamorous and troublesome; which determined him not to publish the second volume during his life: but that posterity might be in no danger of disappointment, he deposited one copy in the Cotton library, and transmitted another to his friend Dupuy at Paris. It was first printed at Leyden in 1625.

Camelus.

tience under hunger is such, that they will travel many days, fed only with a few dates, or some small balls of bean or barley-meal, or on the miserable thorny plants they find in the desert. The camel carries very heavy burdens; and travels long, but with a slow pace. The largest kind will carry a load of 1000 or 1200 lb weight. They kneel down to be loaded, but rise the moment they find the burden equal to their strength: they will not permit an ounce more to be put on. They are most mild and gentle at all times but when they are in heat: during that period they are seized with a sort of madness, so that it is unsafe to approach them. They are not prevailed on to quicken their pace by blows; but go freely if gently treated, and seem enlivened by the pipe or any music. When fatigued, they lie on their breast.

PL. LXVIII.
fig. 3.

II. The BACTRIANUS, or Bactrian camel, has two bunches on the back, the hindmost of which is by much the largest. It is a native of Africa, and is more rarely to be met with than the dromedary. It is also much swifter in its motions. Camels have been the riches of Arabia from the time of Job to the present; the patriarch reckoned 6000 camels among his pastoral treasures, and the modern inhabitants of these countries estimate their wealth by the number of camels they possess: without them great part of Asia and Africa would be wretched; by them the sole commerce is carried on through arid and burning tracts, impassable but by beasts which Providence formed expressly for the burning deserts. They do not differ in their nature or manners from the other kind. In winter they are covered with very long hair, which falls off in the spring, and is carefully gathered, being wove into stuffs, and also cloths to cover tents. In summer their hair is short. Before the great heats, the owners smear their bodies to keep off the flies. The Arabs are very fond of the flesh of young camels. The milk of these animals is their principal subsistence; and the dung of camels is the fuel used by the caravans in the travels over the deserts. Camels have been introduced into Barbadoes and Jamaica; but for want of knowledge of their diet and treatment, have in general been of very little service.

There are varieties among the camels. The Turkman is the largest and strongest. The Arabian is hardy. What is called the *dromedary*, *mailbury*, and *raguahl*, is very swift. The common sort travel about 30 miles a-day. The last, which has a less bunch, and more delicate shape, and is also much inferior in size, never carries burdens, but is used to ride on. In Arabia they are trained for running matches; and in many places for carrying couriers, who can go above 100 miles a day on them, and that for nine days together, over burning deserts uninhabitable by any living creature. The Chinese call these swift camels expressively *song kyo to*, or camels with feet of the wind. The African camels are the most hardy, having more distant and more dreadful deserts to pass over than any of the others, from Numidia to the kingdom of Ethiopia.

III. The GLAMA, Llama, or South-American camel-sheep, has an almost even back, small head, fine black eyes, and very long neck, bending much, and very protuberant near the junction with the body: in a tame state, with smooth short hair; in a wild

state, with long coarse hair, white, grey, and russet, disposed in spots; with a black line from the head along the top of the back to the tail, and belly white. The spotted may possibly be the tame, the last the wild, llamas. The tail is short; the height from four to four feet and a half; the length from the neck to the tail, six feet. The carcase divested of skin and offals, according to the editor of Mr Barron's voyage, weighed 200 lb. In general, the shape exactly resembles a camel, only it wants the dorsal bunch. It is the camel of Peru and Chili; and, before the arrival of the Spaniards, was the only beast of burden known to the Indians. It is very mild, gentle, and tractable. We find, that, before the introduction of mules, they were used by the Indians to plough the land: that at present they serve to carry burdens of about 100 lb.: that they go with great gravity; and, like their Spanish masters, nothing can prevail upon them to change their pace. They lie down to the burden; and when wearied, no blows can provoke them to go on. Teuilee says, they are so capricious, that if struck, they instantly squat down, and nothing but caresses can make them arise. When angry, they have no other method of revenging their injuries than by spitting; and they can ejaculate their saliva to the distance of ten paces: if it falls on the skin, it raises an itching and a reddish spot. Their flesh is eaten, and is said to be as good as mutton. The wool has a strong disagreeable scent. They are very sure footed; therefore used to carry the Peruvian ores over the ruggedest hills and narrowest paths of the Andes. They inhabit that vast chain of mountains their whole length to the straits of Magellan; but except where these hills approach the sea, as in Patagonia, never appear on the coasts. Like the camel, they have powers of abstaining long from drink, sometimes for four or five days: like that animal, their food is coarse and trifling. — As every domestic animal has, or had its stock or origin in a wild state, we believe the llama and guanaco to be the same. The llama is described as the largest of the two domestic animals the Peruvians have; for, except that, they know no other than the congenerous pacos. We find two animals similar to these, wild; the larger, or guanaco, may be supposed to be a savage llama; the lesser, or vucuna, to be the pacos, in a state of nature: the brief descriptions we have left us of each, give us little room to doubt but that the difference of colour and hair arises only from culture. In a wild state, they keep in great herds in the highest and steepest parts of the hills; and while they are feeding, one keeps centry on the pinnacle of some rock: if it perceives the approach of any one, it neighs; the herd takes the alarm, and goes off with incredible speed. They outrun all dogs, so there is no other way of killing them but with the gun. They are killed for the sake of their flesh and hair; for the Indians weave the last into cloth. From the form of the parts of generation in both sexes, no animal copulates with such difficulty. It is often the labour of a day, *antequam autem ipsam veneremur incipiant, et absolvant*.

IV. The PACOS, or sheep of Chili, has no bunch on the back. It is covered with a fine valuable wool, which is of a rose red colour on the back of the animal, and white on the belly. They are of the same nature with the preceding; inhabit the same places, but are more capable of supporting the rigour of frost and snow: they live in

Camelus.

Fig. 3.
BACTRIANUS OF BACTRIAN CAMEL



Fig. 2.
DROMADERICUS
OF AFRICAN CAMEL

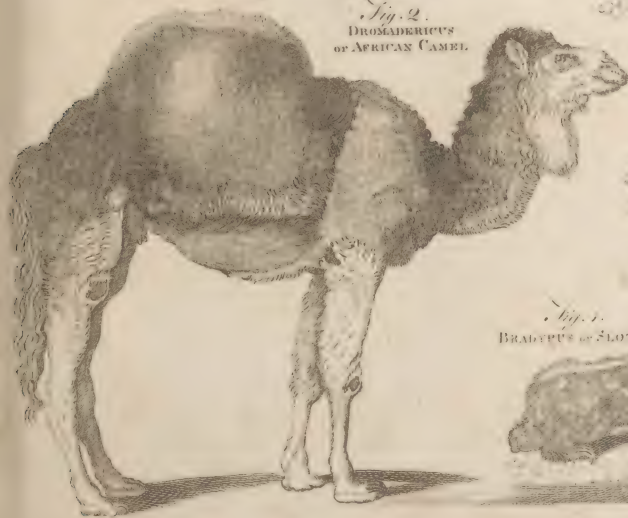
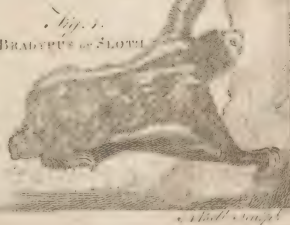


Fig. 1.
BRADYPUS OF SLOTH



W. B. Smith del.



vast herds; are very timid, and exceedingly swift. The Indians take the pacos in a strange manner: they tie cords with bits of cloth or wool hanging to them, above three or four feet from the ground, cross the narrow passes of the mountains, then drive those animals towards them, which are so terrified by the flutter of the rags, as not to dare to pass, but, huddling together, give the hunters an opportunity to kill with their slings as many as they please. The tame ones will carry from 50 to 75 lb; but are kept principally for the sake of the wool and the flesh which is exceedingly well tasted.

CAMERA OBSCURA, a darkened room, or place into which a beam of light may be admitted through a small aperture; and wherein, by means of a proper apparatus, the images of external objects are exhibited distinctly in their natural colours; as is explained under the article DIOPTRICS.

CAMERARIA, in botany, a genus of the monogynia order, belonging to the pentandria class of plants. Of this there are two species; the latifolia, and the angustifolia. The first is a native of the island of Cuba, and rises with a shrubby stalk to the height of 10 or 12 feet, dividing into several branches, garnished with roundish pointed leaves placed opposite. The flowers are produced at the end of the branches in loose clusters, which have long tubes enlarging gradually upward, and at the top are cut into five segments broad at their base, but ending in sharp points; the flower is of a yellowish white colour. The second sort has an irregular shrubby stalk, which rises about eight feet high, sending out many branches which are garnished with very narrow thin leaves placed opposite at each joint. The flowers are produced scatteringly at the end of the branches, which are shaped like those of the former sort, but smaller. It is a native of Jamaica. Both these plants abound with an acrid milky juice like the spurge. They are propagated by seeds, which must be procured from the places of their growth. They may also be propagated by cuttings planted in a hot-bed during the summer-months: they must have a bark-stove, for they are very tender plants; but in warm weather they must have plenty of air.

CAMERARIUS (Joachim), one of the most learned writers of his time, was born in 1500, at Bamberg, a city of Franconia; and obtained great reputation by his writings. He translated into Latin Herodotus, Demosthenes, Xenophon, Euclid, Homer, Theocritus, Sophocles, Lucian, Theodoret, Nicephorus, &c. He published a catalogue of the bishops of the principal sees; Greek epistles; Accounts of his journeys, in Latin verse; a Commentary on Plautus; the Lives of Helius Eobanus Hessus, and Philip Melancthon, &c. He died in 1574.

CAMERARIUS (Joachim), son of the former, and a learned physician, was born at Nuremberg in 1534. After having finished his studies in Germany, he went into Italy, where he obtained the esteem of the learned. At his return he was courted by several princes to live with them; but he was too much devoted to books, and the study of chemistry and botany, to comply. He wrote an horstus medicus, and several other works. He died in 1598.

CAMERATED, among builders, the same with vaulted or arched.

CAMERET-BAY, in the province of Brittany in

France, forms the harbour of Brest. See BREST.

CAMERINO, a town of the ecclesiastical state in Italy, situated in E. Long. 13. 7. N. Lat. 45. 5.

CAMERLINGO, according to Ducange, signified formerly the pope's or emperor's treasurer: at present, camerlingo is no where used but at Rome, where it denotes the cardinal who governs the ecclesiastical state and administers justice. It is the most eminent office at the court of Rome, because he is at the head of the treasury. During a vacation of the papal chair, the cardinal camerlingo publishes edicts, coins money, and exerts every other prerogative of a sovereign prince; he has under him a treasurer-general, auditor-general, and 12 prelates called *clerks of the chamber*.

CAMERON (John), one of the most famous divines among the Protestants of France in the 17th century, was born at Glasgow in Scotland, where he taught the Greek tongue; and having read lectures upon that language for about a year, travelled, and became professor at several universities, and minister at Bourdeaux. He published, 1. Theological lectures; 2. *Icon Johannis Cameronii*; and some miscellaneous pieces. He died in 1625, aged 60.

CAMERONIANS, a party of Presbyterians, which sprung up in Scotland in the reign of king Charles II. They affirmed that the king had forfeited his right to the crown, by breaking the solemn league and covenant, which were the terms on which he received it. They pretended both to dethrone and excommunicate him; and broke out into an open rebellion. Upon the revolution, they were reconciled to the kirk; and their preachers submitted to the general assembly of the church of Scotland, in 1690. That sect is now greatly declined. They are few in number, and split into many parties.

CAMERONIANS, or *Cameronites*, is also the denomination of a party of Calvinists in France, who asserted that the will of man is only determined by the practical judgment of the mind; that the cause of mens doing good or evil proceeds from the knowledge which God infuses into them; and that God does not move the will physically, but only morally, in virtue of its dependence on the judgment of the mind. They had this name from John Cameron, a famous professor, first at Glasgow, where he was born, in 1580, and afterwards at Bourdeaux, Sedan, and Saumur; at which last place he broached his new doctrine of grace and free-will, which was formed by Amyraut, Cappel, Bochart, Daille, and others of the more learned among the reformed ministers, who judged Calvin's doctrines on these points too harsh. The Cameronians are a sort of mitigated Calvinists, and approach to the opinion of the Arminians. They are also called *Universalists*, as holding the universality of Christ's death; and sometimes *Amyraldists*. The rigid adherents to the synod of Dort accused them of Pelagianism, and even of Manicheism. The controversy between the parties was carried on with a zeal and subtilty scarce conceivable; yet all the question between them was only, Whether the will of man is determined by the immediate action of God upon it, or by the intervention of a knowledge which God impresses into the mind? The synod of Dort had defined that God not only illuminates the understanding, but gives motion to the will by making an internal change therein. Cameron only admitted the

Camillus
I
Cammin.

the illumination; whereby the mind is morally moved, and explained the ferment of the fynod of Dort so as to make the two opinions consistent.

CAMILLUS (Marcus Furius), was the first who rendered the family of *Furius* illustrious. He triumphed four times, was five times dictator, and was honoured with the title of the *second founder of Rome*. In a word, he acquired all the glory a man can gain in his own country. Lucius Apulcius, one of the tribunes, prosecuted him to make him give an account of the spoils taken at Veii. Camillus anticipated judgment, and banished himself voluntarily. During his banishment, instead of rejoicing at the devastation of Rome by the Gauls, he exerted all his wisdom and bravery to drive away the enemy; and yet kept with the utmost strictness the sacred law of Rome, in refusing to accept the command which several private persons offered him. The Romans, who were besieged in the capitol, created him dictator in the year 363; in which office he acted with so much bravery and conduct, that he entirely drove the army of the Gauls out of the territories of the commonwealth. He died in the 81st year of his age, 365 years before the Christian æra.

CAMILLI, and **CAMILLE**, in Roman antiquity, a certain number of boys and girls, who assisted in the sacrifices to the gods, but more especially attended the flamen dialis.

CAMINHA, a maritime town of Portugal, in the province of Entre-Duero-e-Minho, with the title of a duchy. It is situated at the mouth of the river Minho, in W. Long. 9. 15. N. Lat. 41. 44.

CAMIS, or **KAMIS**, in the Japonic affairs, denote the deified souls of illustrious personages, believed to interest themselves in the welfare of their countrymen: in which sense they answer to the deified heroes of antiquity. See **HERO**.

CAMISADE, in the art of war, an attack by surprise in the night, or at the break of day, when the enemy is supposed to be a-bed. The word is said to have taken its rise from an attack of this kind; wherein, as a badge or signal to know one another by, they bore a shift, in French called *chemise*, or *camise*, over their arms.

CAMISARDS, a name given by the French to the Calvinists of the Cevennes, who formed a league, and took up arms in their own defence, in 1688.

CAMLETINE, a slight stuff, made of hair and coarse silk, in the manner of camblet. It is now out of fashion.

CAMMA, and **GOMBI**, two provinces of the kingdom of Loango in Africa. The inhabitants are continually at war with each other. The weapons they formerly used in their wars were the short pike, bows and arrows, sword and dagger; but since the Europeans have become acquainted with that craft, they have supplied them with fire-arms. The chief town of Gombi lies about a day's journey from the sea. Their rivers abound with a variety of fish; but are infested with scorpions, which do great mischief both by land and water. The principal commerce with the natives is in logwood, elephants teeth, and tails, the hair of which is highly valued, and used for several curious purposes.

CAMMIN, a maritime town of Germany, in Brandenburg Pomerania, situated in E. Long. 15°. N. Lat. 54°.

Camoens.

CAMOENS (Louis de), a famous Portuguese poet, the honour of whose birth is claimed by different cities. But according to N. Antonio, and Manuel Correa his intimate friend, this event happened at Lisbon in 1517. His family was of considerable note, and originally Spanish. In 1370, Vasco Perez de Caamans, disgraced at the court of Castile, fled to that of Lisbon, where king Ferdinand immediately admitted him into his council, and gave him the lordships of Sardoal, Punete, Marano, Amendo, and other considerable lands; a certain proof of the eminence of his rank and abilities. In the war for the succession, which broke out on the death of Ferdinand, Camoens sided with the king of Castile, and was killed in the battle of Aljubarota. But though John I. the victor, seized a great part of his estate, his widow, the daughter of Gonsalo Tereyro, grand master of the order of Christ, and general of the Portuguese army, was not reduced beneath her rank. She had three sons who took the name of *Camoens*. The family of the eldest intermarried with the first nobility of Portugal; and even, according to Caistera, with the blood royal. But the family of the second brother, whose fortune was slender, had the superior honour to produce the author of the *Lusiad*.

Early in his life the misfortunes of the poet began. In his infancy, Simon Vaz de Camoens, his father, commander of a vessel, was shipwrecked at Goa, where, with his life, the greatest part of his fortune was lost. His mother, however, Anne de Macedo of Santarene, provided for the education of her son Louis at the university of Coimbra. What he acquired there, his works discover; an intimacy with the classics, equal to that of a Scaliger, but directed by the taste of a Milton or a Pope.

When he left the university, he appeared at court. He was handsome; had speaking eyes, it is said; and the finest complexion. Certain it is, however, he was a polished scholar, which, added to the natural ardour and gay vivacity of his disposition, rendered him an accomplished gentleman. Courts are the scenes of intrigue; and intrigue was fashionable at Lisbon. But the particulars of the amours of Camoens rest unknown. This only appears: he had aspired above his rank, for he was banished from the court; and in several of his sonnets he ascribes this misfortune to love.

He now retired to his mother's friends at Santarene. Here he renewed his studies, and began his poem on the discovery of India. John III. at this time prepared an armament against Africa. Camoens, tired of his inactive obscure life, went to Ceuta in this expedition, and greatly distinguished his valour in several encounters. In a naval engagement with the Moors in the straits of Gibraltar, in the conflict of boarding, he was among the foremost, and lost his right eye. Yet neither hurry of actual service nor the dissipation of the camp could flit his genius. He continued his *Lusitadar*, and several of his most beautiful sonnets were written in Africa, while, as he expressed it,

One hand the pen, and one the sword, employ'd.

The fame of his valour had now reached the court, and he obtained permission to return to Lisbon. But, while he solicited an establishment which he had merited in the ranks of battle, the malignity of evil tongues, as he calls it in one of his letters, was injuriously poured upon him. Though the bloom of his early youth

was

was effaced by several years residence under the scorching heavens of Africa, and though altered by the loss of an eye, his preference gave uneasiness to the gentlemen of some families of the first rank where he had formerly vilted. Jealousy is the characteristic of the Spanish and Portuguese; its resentment knows no bounds, and Camoens now found it prudent to banish himself from his native country. Accordingly, in 1553, he sailed for India, with a resolution never to return. As the ship left the Tagus, he exclaimed, in the words of the sepulchral monument of Scipio Africanus, *Ingrata patria, non possidebis ossa mea!* "Ungrateful country, thou shalt not possess my bones!" But he knew not what evils in the East would awake the remembrance of his native fields.

When Camoens arrived in India, an expedition was ready to sail to revenge the king of Cochín on the king of Pimenta. Without any rest on shore after his long voyage, he joined this armament, and in the conquest of the Alagada islands displayed his usual bravery.

In the year following, he attended Manuel de Vafconcello in an expedition to the Red Sea. Here, says Faria, as Camoens had no use for his sword, he employed his pen. Nor was his activity confined in the fleet or camp. He visited Mount Felix and the adjacent inhospitable regions of Afriq, which he so strongly pictures in the *Lusiad*, and in one of his little pieces where he laments the absence of his mistress.

When he returned to Goa, he enjoyed a tranquillity which enabled him to bestow his attention on his Epic Poem. But this serenity was interrupted, perhaps by his own imprudence. He wrote some satires which gave offence; and, by order of the viceroy Francisco Barreto, he was banished to China.

The accomplishments and manners of Camoens soon found him friends, though under the disgrace of banishment. He was appointed commissary of the defunct in the island of Macao, a Portuguese settlement in the bay of Canton. Here he continued his *Lusiad*; and here also, after five years residence, he acquired a fortune, though small, yet equal to his wishes. Don Constantine de Braganza was now viceroy of India; and Camoens, desirous to return to Goa, resigned his charge. In a ship, freighted by himself, he set sail; but was shipwrecked in the gulph near the mouth of the river Mehon on the coast of China. All he had acquired was lost in the waves: his poems, which he held in one hand, while he swam with the other, were all he found himself possessed of when he stood friendless on the unknown shore. But the natives gave him a most humane reception: this he has immortalised in the prophetic song in the tenth *Lusiad*; and in the seventh, he tells us, that here he lost the wealth which satisfied his wishes.

Agora da esperança ja adquirida, &c.

Now blest with all the wealth long hope could crave,
Soon I behold that wealth beneath the wave
For ever lost —
My life, like Judah's heaven-doom'd king of yore,
By miracle prolong'd —

On the banks of the Mehon, he wrote his beautiful paraphrase of the psalm, where the Jews, in the finest strain of poetry, are represented as hanging their harps on the willows by the rivers of Babylon, and weeping their exile from their native country. Here Camoens continued some time, till an opportunity offered to carry

him to Goa. When he arrived at that city, Don Constantine de Braganza, the viceroy, whose characteristic was politeness, admitted him into intimate friendship, and Camoens was happy till count Redondo assumed the government. Those who had formerly procured the banishment of the satyrists, were silent while Constantine was in power. But now they exerted all their arts against him. Redondo, when he entered on office, pretended to be the friend of Camoens; yet, with all that unfeeling indifference with which he made his most horrible witticism on the Zamorim, he suffered the innocent man to be thrown into the common prison. After all the delay of bringing witnesses, Camoens, in a public trial, fully refuted every accusation of his conduct while commissary at Macao, and his enemies were loaded with ignominy and reproach. But Camoens had some creditors; and these detained him in prison a considerable time, till the gentlemen of Goa began to be ashamed that a man of his singular merit should experience such treatment among them. He was set at liberty; and again he assumed the profession of arms, and received the allowance of a gentleman volunteer, a character at this time common in Portuguese India. Soon after, Pedro Barreto, appointed governor of the fort at Sofala, by high promises, allured the poet to attend him thither. The governor of a distant fort, in a barbarous country, shares in some measure the fate of an exile. Yet, though the only motive of Barreto was, in this unpleasant situation, to retain the conversation of Camoens at his table, it was his least care to render the life of his guest agreeable. Chagrined with his treatment, and a considerable time having elapsed in vain dependence upon Barreto, Camoens resolved to return to his native country. A ship, on the homeward voyage, at this time touched at Sofala, and several gentlemen who were on board were desirous that Camoens should accompany them. But this the governor ungenerously endeavoured to prevent, and charged him with a debt for board. Anthony de Cabral, however, and Hector de Sylveira, paid the demand; and Camoens, says Faria, and the honour of Barreto, were sold together.

After an absence of 16 years, Camoens, in 1569, returned to Lisbon, unhappy even in his arrival, for the pestilence then raged in that city, and prevented his publication for three years. At last, in 1572, he printed his *Lusiad*, which, in the opening of the first book, in a most elegant turn of compliment, he addressed to his prince, king Sebastian, then in his 18th year. The king, says the French translator, was so pleased with his merit, that he gave the author a pension of 4000 reals, on condition that he should reside at court. But this salary, says the same writer, was withdrawn by cardinal Henry, who succeeded to the crown of Portugal, lost by Sebastian at the battle of Alcazar.

Though the great patron of one species of literature, a species the reverse of that of Camoens, certain it is, that the author of the *Lusiad* was utterly neglected by Henry, under whose inglorious reign he died in all the misery of poverty. By some, it is said, he died in an alms-house. It appears, however, that he had not even the certainty of subsistence which these houses provide. He had a black servant, who had grown old with him, and who had long experienced his master's humanity. This grateful Indian, a native of Java, who, according

Camomile,
Camp.

to some writers, saved his master's life in the unhappy shipwreck where he lost his effects, begged in the streets of Lisbon for the only man in Portugal on whom God had bestowed those talents which have a tendency to erect the spirit of a downward age. To the eye of a careful observer, the fate of Camoens throws great light on that of his country, and will appear strictly connected with it. The same ignorance, the same degenerated spirit, which suffered Camoens to depend on his share of the alms begged in the streets by his old hoary servant, the same spirit which caused this, sunk the kingdom of Portugal into the most abject vassalage ever experienced by a conquered nation. While the grandees of Portugal were blind to the ruin which impended over them, Camoens beheld it with a pungency of grief which hastened his exit. In one of his letters he has these remarkable words: *Em fim accaberey à vida, e narrar todos que fuy efecuada a minha patria, &c.* "I am ending the course of my life, the world will witness how I have loved my country. I have returned, not only to die in her bosom, but to die with her."

In this unhappy situation, in 1579, in his 62^d year, the year after the fatal defeat of Don Sebastian, died Louis de Camoens, the greatest literary genius ever produced by Portugal; in martial courage and spirit of honour, nothing inferior to her greatest heroes. And in a manner suitable to the poverty in which he died, was he buried.

CAMOMILE, in botany. See ANTHEMIS.

CAMP, the ground on which an army pitch their tents. It is marked out by the quarter-master general, who appoints every regiment their ground.

The chief advantages to be minded in chusing a camp for an army, are, to have it near the water, in a country of forage, where the soldiers may find wood for dressing their victuals; that it have a free communication with garriſons, and with a country from whence it may be supplied with provisions; and, if possible, that it be situated on a rising ground, in a dry gravelly soil. Besides, the advantages of the ground ought to be considered, as marshes, woods, rivers, and inclosures; and if the camp be near the enemy, with no river or marsh to cover it, the army ought to be intrenched. An army always encamps fronting the enemy; and generally in two lines, running parallel about 500 yards distance; the horse and dragoons, on the wings, and the foot, in the centre: sometimes a body of two, three, or four brigades is encamped behind the two lines, and is called the *body of reserve*. The artillery and bread-waggons are generally encamped in the rear of the two lines. A battalion of foot is allowed 80 or 100 paces for its camp; and 30 or 40 for an interval betwixt one battalion and another. A squadron of horse is allowed 30 for its camp, and 30 for an interval, and more if the ground will allow it.

Where the grounds are equally dry, those camps are always the most healthful that are pitched on the banks of large rivers; because, in the hot season, situations of this kind have a stream of fresh air from the water, serving to carry off the moist and putrid exhalations. On the other hand, next to marshes, the worst encampments are on low grounds close beset with trees; for then the air is not only moist and hurtful in itself, but by stagnating becomes more susceptible of corruption. However, let the situation of camps be ever so good,

Camp.

they are frequently rendered infectious by the putrid effluvia of rotten straw, and the privies of the army; more especially if the bloody flux prevails, in which case the best method of preventing a general infection, is to leave the ground with the privies, foul straw, and other filth of the camp, behind. This must be frequently done, if consistent with the military operations: but when these render it improper to change the ground often, the privies should be made deeper than usual, and once a-day a thick layer of earth thrown into them till the pits are near full; and then they are to be well covered, and supplied by others. It may also be a proper caution to order the pits to be made either in the front or the rear, as the then stationary winds may best carry off their effluvia from the camp. Moreover, it will be necessary to change the straw frequently, as being not only apt to rot, but to retain the infectious steams of the sick. But if fresh straw cannot be procured, more care must be taken in airing the tents, as well as the old straw.

The disposition of the Hebrew encampment was at first laid out by God himself. Their camp was of a quadrangular form, furrounded with an inclosure of the height of 10 hands-breadth. It made a square of 12 miles in compass about the tabernacle; and within this was another, called the *Levites camp*.

The Greeks had also their camps, fortified with gates and ditches. The Lacedæmonians made their camp of a round-figure, looking upon that as the most perfect and defensible of any form: we are not, however, to imagine, that they thought this form so essential to a camp, as never to be dispensed with when the circumstance of the place required it. Of the rest of the Grecian camps, it may be observed, that the most valiant of the soldiers were placed at the extremities, the rest in the middle. Thus we learn from Homer, that Achilles and Ajax were posted at the ends of the camp before Troy, as bulwarks on each side of the rest of the princes.

The figure of the Roman camp was a square divided into two principal parts: in the upper part were the general's pavilion, or prætorium, and the tents of the chief officers; in the lower, those of inferior degree were placed. On one side of the prætorium stood the quæstorium, or apartment of the treasurer of the army; and near this the forum, both for a market-place, and the assembling of councils. On the other side of the prætorium were lodged the legati; and below it the tribunes had their quarters, opposite to their respective legions. Aside of the tribunes were the prefects of the foreign troops, over against their respective wings; and behind these were the lodgments of the evocati, then those of the extraordinarii and ablecti equites, which concluded the higher part of the camp. Between the two partitions was a spot of ground called *principia*, for the altars and images of the gods, and probably also for the chief ensigns. The middle of the lower partition was assigned to the Roman horse; next to them were quartered the triarii; then the principes, and close by them the hastati; afterwards the foreign horse, and lastly the foreign foot. They fortified their camp with a ditch and parapet, which they termed *fossa* and *vallum*; in the latter some distinguish two parts, *viz.* the *agger* or earth, and the *fudes* or wooden stakes driven in to secure it. The camps were sometimes surrounded by walls made of hewn stone; and the

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the tents themselves formed of the same matter.

In the front of the Turkish camp are quartered the janizaries and other foot, whose tents encompass their aga: in the rear are the quarters of the spahis and other horsemen. The body of the camp is possessed by the stately tents or pavilions of the vizier or general, rais effendi or chancellor, kahija or steward, the tellard bashaw or lord treasurer, and kapiflar kahiafee or master of the ceremonies. In the middle of these tents is a spacious field, wherein are erected a building for the divan, and a hafna or treasury. When the ground is marked out for a camp, all wait for the pitching of the tent *lailac*, the place where the courts of justice are held; it being the disposition of this that is to regulate all the rest.

The Arabs still live in camps, as the ancient Scenites did. The camp of the Affyne Emir, or king of the country about Tadmor, is described by a traveller who viewed it, as spread over a very large plain, and possessing so vast a space, that though he had the advantage of a rising ground, he could not see the utmost extent of it. His own tent was near the middle; scarce distinguishable from the rest, except that it was bigger, being made, like the others, of a sort of hair-cloth.

CAMP, is also used by the Siamese, and some other nations in the East Indies, as the name of the quarters which they assign to foreigners who come to trade with them. In these camps, every nation forms, as it were, a particular town, where they carry on all their trade, not only keeping all their warehouses and shops there, but also live in these camps with their whole families. The Europeans, however, are so far indulged, that at Siam, and almost every where else, they may live either in the cities or suburbs, as they shall judge most convenient.

CAMPAGNA. See CAMPANIA.

CAMPAIGN, in the art of war, denotes the space of time that an army keeps the field, or is encamped.—The beginning of every campaign is considerably more unhealthy than if the men were to remain in quarters. After the first fortnight or three weeks encampment, the sickness decreases daily; the most infirm being by that time in the hospitals, and the weather daily growing warmer. This healthy state continues throughout the summer, unless the men get wet clothes or wet beds; in which case, a greater or less degree of the dysentery will appear in proportion to the preceding heats. But the most sickly part of the campaign begins about the middle or end of August, whilst the days are still hot, but the nights cool and damp, with fogs and dews; then, and not sooner, the dysentery prevails; and though its violence is over by the beginning of October, yet the remitting fever gaining ground, continues throughout the rest of the campaign, and never entirely ceases, even in winter-quarters, till the frosts begin. At the beginning of a campaign the sickness is so uniform, that the number may be nearly predicted; but, for the rest of the season, as the diseases are then of a contagious nature, and depend so much upon the heats of summer, it is impossible to foresee how many may fall sick from the beginning to the end of autumn. It is also observed, that the last fortnight of a campaign, if protracted till the beginning of a campaign, is attended with more sickness than the first two months encampment: so that it is better to take the field a

fortnight sooner, in order to return into winter-quarters so much the earlier. As to winter expeditions, though severe in appearance, they are attended with little sickness, if the men have strong shoes, quarters, fuel, and provisions. Long marches in summer are not without danger, unless made in the night, or so early in the morning as to be over before the heat of the day.

CAMPANACEÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which are the following genera, viz. convolvulus, ipomæa, polemonium, campanula, roella, viola, &c. &c.

CAMPANELLA (Thomas), a famous Italian philosopher, born at Stilo in Calabria, in 1568. He distinguished himself by his early proficiency in learning; for at the age of 13 he was a perfect master of the ancient orators and poets. His peculiar inclination was to philosophy, to which he at last confined his whole time and study. In order to arrive at truth, he shook off the yoke of authority: by which means the novelty of some of his opinions exposed him to many inconveniences; for at Naples he was thrown into prison, in which he remained 27 years, and during this confinement wrote his famous work entitled *Atheismus triumphatus*. Being at length set at liberty, he went to Paris, where he was graciously received by Lewis XIII. and cardinal Richelieu; the latter procured him a pension of 2000 livres, and often consulted him on the affairs of Italy. Campanella passed the remainder of his days in a monastery of Dominicans at Paris, and died in 1639.

CAMPANI (Matthew) of Spoleto, curate at Rome, wrote a curious treatise on the art of cutting glasses for spectacles, and made several improvements in optics, assisted by his brother and pupil Joseph. He died after 1678.

CAMPANIA, a town of Italy, in the kingdom of Naples, and in the farther principato, with a bishop's see. E. Long. 15. 30. N. Lat. 40. 40.

CAMPANIA, or *Campania, di Roma*, anciently Latium, a province of Italy, bounded on the west by the Tiber and the sea, on the south-west by the sea, on the south by Terra di Lavoro, on the east by Abruzzo, and on the north by Sabina. Though the soil is good, it produces little or nothing, on account of the heavy duties on corn; and though the waters are good, the air is unwholesome. It is subject to the Pope, and is about 60 miles in length on the Mediterranean sea.

It hath been generally thought that the air of this country hath something in it peculiarly noxious during the summer-time; but Mr Condamine is of opinion that it is not more unhealthy than any other marshy country. His account follows. "It was after the invasion of the Goths in the fifth and sixth centuries that this corruption of the air began to manifest itself. The bed of the Tiber being covered by the accumulated ruins of the edifices of ancient Rome, could not but raise itself considerably. But what permits us not to doubt of this fact is, that the ancient and well-preserved pavement of the Pantheon and its portico is overflowed every winter; that the water even rises there sometimes to the height of eight or ten feet; and that it is not possible to suppose that the ancient Romans should have built a temple in a place so low as to be covered with the waters of the Tiber on the least inundation. It is evident, then, that the level of the bed of this river

* See Botany,
p. 1310.

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is raised several feet; which could have happened without forming there a kind of dikes or bars. The choking up of its canal necessarily occasioned the overflow and reflux of its waters in such places as till then had not been subject to inundations: to these overflows of the Tiber were added all the waters that escaped out of the ancient aqueducts, the ruins of which are still to be seen, and which were entirely broken and destroyed by Totila. What need, therefore, of any thing more to infect the air, in a hot climate, than the exhalations of such a mass of stagnating waters, deprived of any discharge, and become the receptacle of a thousand impurities, as well as the grave of several millions both of men and animals? The evil could not but increase from the same causes while Rome was exposed to the incursions and devastations of the Lombards, the Normans, and the Saracens, which lasted for several centuries. The air was become so infectious there at the beginning of the 13th century, that Pope Innocent III. wrote, that few people at Rome arrived to the age of forty years, and that nothing was more uncommon there than to see a person of sixty. A very short time after, the popes transferred the seat of their residence to Avignon: during the seventy-two years they remained there, Rome became a desert; the monasteries in it were converted into stables; and Gregory XI. on his return to Rome, in 1376, hardly counted there 30,000 inhabitants. At his death began the troubles of the great schism in the west, which continued for upwards of 50 years. Martin V. in whom this schism ended in the year 1429, and his first successors, were able to make but feeble efforts against so inveterate an evil. It was not till the beginning of the 16th century that Leo X. under whom Rome began to resume her wonted splendor, gave himself some trouble about re-establishing the salubrity of the air: but the city, being shortly after besieged twice successively by the emperor Charles V. saw itself plunged again into all its old calamities; and from 85,000 inhabitants, which it contained under Leo X. it was reduced under Clement VIII. to 32,000. In short, it is only since the time of Pius V. and Sixtus V. at the end of the 16th century, that the popes have constantly employed the necessary methods for purifying the air of Rome and its environs, by procuring proper discharges for the waters, drying up the humid and marshy grounds, and covering the banks of the Tiber and other places reputed uninhabitable with superb edifices. Since that time a person may dwell at Rome, and go in or out of it at all seasons of the year. At the beginning, however, of the present century, they were still afraid to lie out of the city in summer, when they had resided there; as they were also to return to it, when once they had quitted it. They never ventured to sleep at Rome, even in broad day, in any other house than their own. They are greatly relaxed at present from these ancient scruples: I have seen cardinals, in the months of July and August, go from Rome to lie at Frascati, Tivoli, Albano, &c. and return the next or the following days to the city, without any detriment to their health: I have myself tried all these experiments, without suffering the least inconvenience from them: we have even seen, in the last war in Italy, two armies encamped under the walls of Rome at the time when the heats were most violent. Yet, notwithstanding all this, the

greater part of the country people dare not still venture to lie during that season of the year, nor even as much as sleep in a carriage, in any part of the territory comprehended under the name of the *Campagna of Rome*."

CAMPANIFORM, or CAMPANULATED, an appellation given to flowers resembling a bell.

CAMPANINI, a name given to an Italian marble dug out of the mountains of Carrara, because, when it is worked, it sounds like a bell.

CAMPANULA, or BELL-FLOWER; a genus of the monogynia order, belonging to the pentandria class of plants.

Species. Of this genus there are no fewer than 41 species enumerated by botanical writers; but the following are the most worthy of attention. 1. The pyramidalis hath thick tuberous roots filled with a milky juice; it sends out strong, smooth, upright stalks, which rise to the height of four feet, garnished with smooth oblong leaves a little indented at the edges. The flowers are produced from the side of the stalks, and are regularly set on for more than half their length, forming a sort of pyramid; these are large, open, and shaped like a bell. The most common colour of the flowers is blue, though some are white, but the former are most esteemed. 2. The decurrens, or peach-leaved bell-flower, is a native of the northern parts of Europe: of this there are some with white, and some with blue flowers, and some with double flowers of both colours. These last have of late been propagated in such abundance as to have almost banished from the gardens those with single flowers. 3. The medium, commonly called *Canterbury bell-flower*, is a biennial plant, which perishes soon after it has ripened its seeds. It grows naturally in the woods of Italy and Austria; but is cultivated in the British gardens for the beauty of its flowers, which are blue, purple, white, and striped, with double flowers of all the colours. This species hath oblong, rough, hairy leaves, serrated on their edges: from the centre of these rises a stiff, hairy, furrowed stalk, about two feet high, sending out several lateral branches, garnished with long, narrow, hairy leaves sawed on their edges. From the setting on of these leaves proceed the foot-stalks of the flower; those which are on the lower part of the stalk and branches diminishing gradually in their length upward, and thereby forming a sort of pyramid. The flowers of this kind are very large, so make a fine appearance. The seeds ripen in September, and the plants decay soon after. 4. The trachelium, with nettle leaves, hath a perennial root, which sends up several stiff hairy stalks having two ribs or angles. These put out a few short side-branches, garnished with oblong hairy leaves deeply sawed on their edges. Toward the upper part of the stalks, the flowers come out alternately upon short trifid foot-stalks having hairy empalements. The colours of the flowers are a deep and a pale blue and white, with double flowers of the same; the double-flowered kind only merit a place in gardens. 5. The latifolia, or greatest bell-flower, hath a perennial root, composed of many fleshy fibres that abound with a milky juice. From these arise several strong, round, single stalks, which never put out branches, but are garnished with oval spear-shaped leaves slightly indented on their edges. Towards the upper part of the stalk the flowers come out singly upon short foot-stalks; their colours are blue, purple, and white. 6. The

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rapunculus, or rampion, hath roundish fleshy roots, which are eatable, and much cultivated in France for fallads; some years past it was cultivated in the English gardens for the same purpose, but is now generally neglected. It is a native of Britain; but the roots of the wild fort never grow to half the size of those which are cultivated. 7. The speculum, with yellow eye-bright leaves, is an annual plant with slender stalks rising a foot high, branching out on every side, and garnished with oblong leaves a little curled on their edges; from the wings of the leaves come out the flowers sitting close to the stalks, which are of a beautiful purple inclining to a violet colour. In the evening, they contract and fold into a pentagonal figure; from whence it is by some called *viola pentagonia*, or *five-cornered violet*. 8. The hybrida, or common Venus looking-glass. This seldom rises more than six inches high, with a stalk branching from the bottom upward, and garnished with oval leaves sitting close to the stalks, from the base of which the branches are produced, which are terminated by flowers very like the former fort. This was formerly cultivated in the gardens; but since the former kind hath been introduced, it hath almost supplanted this; for the other is a much taller plant, and the flowers larger, though of a less beautiful colour. 9. The canariensis, with an orach leaf and tuberous root, is a native of the Canary islands. It hath a thick fleshy root of an irregular form; sometimes running downward like a parsnep, at other times dividing into several knobs near the top; and when any part of the root is broken, there issues out a milky juice at the wound. From the head or crown of the root arise one, two, three, or more stalks, in proportion to the size of the root; but that in the centre is generally larger, and rises higher, than the others. These stalks are very tender, round, and of a pale green; their joints are far distant from each other; and when the roots are strong, the stalks will rise to ten feet high, sending out several lateral branches. At each joint they are garnished with two, three, or four spear-shaped leaves, with a sharp pointed beard on each side. They are of a sea-green; and, when they first come out, are covered slightly with an ash-coloured pounce. From the joints of the stalk the flowers are produced, which are of the perfect bell-shape, and hang downward; they are of a flame-colour, marked with stripes of a brownish red: the flower is divided into five parts; at the bottom of each is seated a nectarium, covered with a white transparent skin, much resembling those of the crown imperial, but smaller. The flowers begin to open in the beginning of October, and there is often a succession of them till March. The stalks decay to the root in June, and new ones spring up in August.

Culture, &c. The first fort is cultivated to adorn halls, and to place before chimnies in the summer when it is in flower, for which purpose there is no plant more proper; for when the roots are strong, they will send out four or five stalks which will rise as many feet high, and are adorned with flowers a great part of their length. When the flowers begin to open, the pots are removed into the rooms, where, being shaded from the sun and rain, the flowers will continue long in beauty; and if the pots are every night removed into a more airy situation, but not exposed to heavy rains, the flowers will be fairer, and continue much longer in

beauty. Those plants which are thus treated, are seldom fit for the purpose the following season; therefore a supply of young ones must be annually raised. The plant may be propagated either by dividing the roots or by seeds, but the latter produce the most vigorous and best flowering plants. The seeds must be sown in autumn in boxes or pots filled with light undunged earth, and placed in the open air till the frost or hard rains come on: then they must be placed under a hot-bed frame, where they may be sheltered from both; but in mild weather, the glass should be drawn off every day, that they may enjoy the free air: with this management the plants will come up early in the spring, and then they must be removed out of the frame, placing them first in a warm situation; but, when the season becomes warm, they should be so placed as to have the morning sun only. In September the leaves of the plants will begin to decay, at which time they should be transplanted; therefore there must be one or two beds prepared, in proportion to the number of plants. These beds must be in a warm situation, and the earth light, sandy, and without any mixture of dung. The plants must then be taken out of the pots or cases very carefully, so as not to bruise their roots; for they are very tender, and on being broken the milky juice will flow out plentifully, which will greatly weaken them. These should be planted at about six inches distance each way, with the head or crown of the root half an inch below the surface. If the season proves dry, they must be gently watered three or four days after they are planted; the beds should also be covered with mats in the day time, but which should be taken off at night to let the dew fall on the plants. Towards the end of November the beds should be covered over with some old tanners bark to keep out the frost; and where there is not convenience for covering them with frames, they should be arched over with hoops, that in severe weather they may be covered with mats. In the spring the mats must be removed, and, the following summer, the plants kept free from weeds. In autumn the earth should be stirred between them, some Irish earth spread over the beds, and the plants covered in winter as before. In these beds the plants may remain two years, during which time they are to be treated in the manner before directed. The roots will now be strong enough to flower; so, in September they should be carefully taken up, and some of the most promising carefully planted in pots; the others may be planted in warm borders, or in a fresh bed, at a greater distance than before, to allow them room to grow. Those plants which are potted should be sheltered in winter from great rains and hard frosts, otherwise they will be in danger of rotting, or at least will be so weakened as not to flower with any strength the following summer; and those which are planted in the full ground, should have some old tanners bark laid round them to prevent the frost from getting at the roots. The second, third, fourth, and fifth forts are so easily propagated by parting the roots, or by seeds, that no particular directions for their culture need be given. The sixth fort, which is cultivated for its esculent roots, may be propagated by seeds, which are to be sown in a shady border; and when the plants are about an inch high, the ground should be hoed as is practised for onions, to cut up the weeds, and thin the

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plants, to the distance of three or four inches; and when the weeds come up again they must be hoed over to destroy them: this, if well performed in dry weather, will make the ground clean for a long time; so that, being three times repeated, it will keep the plants clean till winter, which is the season for eating the roots, when they may be taken up for use as wanted. They will continue good till April, at which time they fend out their stalks, when the roots become hard and unfit for use.—The seventh and eighth sorts are easily propagated by seeds, which they produce in plenty. If these, and the Venus navelwort, dwarf lychnis, candy-tuft, and other low annual flowers, are properly mixed in the border of the flower-garden, and sown at two or three different seasons, so as to have a succession of them in flower, they will make an agreeable variety. If these seeds are sown in autumn, the plants will flower early in the spring; but if sown in the spring, they will not flower till the middle of June; and if a third sowing is performed about the middle of May, the plants will flower in August; but from these, good seeds must not be expected.—The ninth sort is propagated by parting the roots, which must be done with caution: for if they are broken or wounded, the milky juice will flow out plentifully; and if planted before the wounds are skinned over, it occasions their rotting: therefore when any of them are broken, they should be laid in the green-house a few days to heal. These roots must not be too often parted, if they are expected to flower well; for by this means they are weakened. The best time for transplanting and parting their roots is in July, soon after the stalks are decayed. They must not be planted in rich earth, otherwise they will be very luxuriant in branches, and have but few flowers. They succeed best in a light sandy loam, mixed with a fourth part of screened lime-rubbish: when the roots are first planted the pots should be placed in the shade, and unless the season is very dry they should not be watered; for during the time they are inactive, wet is very injurious to them. About the middle of August, the roots will begin to put out fibres; at which time, if the pots are placed under a hot-bed frame, and as the nights grow cool, covered with the glasses, but opened every day to enjoy the free air, it will greatly forward them for flowering, and increase their strength: when the stalks appear, they must be now and then refreshed with water; but it must not be given too often, nor in too great quantity. The plants thus managed, by the middle of September will have grown so tall as not to be kept any longer under the glass frame; they must, therefore, be removed into a dry airy glass-case, where they may enjoy the free air in mild weather, but screened from the cold. During the winter season they must be frequently refreshed with water, and guarded from frost; and, in the spring, when the stalks begin to decay, the pots should be set abroad in the shade, and not watered.

CAMPBELL (Archibald), earl and marquis of Argyle, was the son of Archibald earl of Argyle, by the lady Anne Douglas, daughter of William earl of Morton. He was born in the year 1598; and educated in the profession of the Protestant religion, according to the strictest rules of the church of Scotland, as it was established immediately after the reformation.

During the commonwealth he was induced to submit to its authority. Upon the restoration, he was tried for his compliance; a crime common to him with the whole nation, and such a one as the most loyal and affectionate subject might frequently by violence be induced to commit. To make this compliance appear the more voluntary and hearty, there were produced in court, letters which he had wrote to Albemarle, while that general governed Scotland, and which contained expressions of the most cordial attachment to the established government. But, besides the general indignation excited by Albemarle's discovery of this private correspondence; men thought, that even the highest demonstrations of affection might, during jealous times, be exacted as a necessary mark of compliance from a person of such distinction as Argyle; and could not, by any equitable construction, imply the crime of treason. The parliament, however, scrupled not to pass sentence upon him, and he suffered with great constancy and courage.

CAMPBELL (Archibald), earl of Argyle, son to the former, had from his youth distinguished himself by his loyalty, and his attachment to the royal family. Tho' his father was head of the covenanters, he himself refused to concur in any of their measures; and when a commission of colonel was given him by the convention of states, he forbore to act upon it till it should be ratified by the king. By his respectful behaviour, as well as by his services, he made himself acceptable to Charles when that prince was in Scotland; and even after the battle of Worcester, all the misfortunes which attended the royal cause could not engage him to desert it. Under Middleton he obstinately persevered to harass and infect the victorious English; and it was not till he received orders from that general, that he would submit to accept of a capitulation. Such jealousy of his loyal attachments was entertained by the commonwealth and protector, that a pretence was soon after fallen upon to commit him to prison; and his confinement was rigorously continued till the restoration. The king, sensible of his services, had remitted to him his father's forfeiture, and created him earl of Argyle; and when a most unjust sentence was passed upon him by the Scots parliament, Charles had anew remitted it. In the subsequent part of this reign Argyle behaved himself dutifully; and though he seemed not disposed to go all lengths with the court, he always appeared, even in his opposition, a man of mild dispositions and peaceable deportment.

A parliament was summoned at Edinburgh in summer 1681, and the duke was appointed commissioner. Besides granting money to the king, and voting the indefeasible right of succession, this parliament enacted a test, which all persons possessed of offices, civil, military, or ecclesiastical, were bound to take. In this test the king's supremacy was asserted, the covenant renounced, passive obedience assented to, and all obligations disclaimed of endeavouring any alteration in civil or ecclesiastical establishments. This was the state of the test as propounded by the courtiers; but the country party propounded also a clause of adherence to the Protestant religion, which could not with decency be rejected. The whole was of an enormous length, considered as an oath; and, what was worse, a confession of faith was there ratified which had been imposed a little after the

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the reformation, and which contained many articles altogether forged by the parliament and nation. Among others, the doctrine of resistance was inculcated; so that the test being voted in a hurry, was found on examination to be a medley of absurdity and contradiction. Though the courtiers could not reject the clause of adhering to the Protestant religion, they proposed, as a requisite mark of respect, that all princes of the blood should be exempted from taking that oath. This exception was zealously opposed by Argyle; who observed that the sole danger to be dreaded for the Protestant religion must proceed from the perversion of the royal family. By insisting on such topics, he drew on himself the secret indignation of the duke of York, of which he soon felt the fatal consequences.

When Argyle took the test as a privy councillor, he subjoined, in the duke's presence, an explanation which he had beforehand communicated to that prince, and which he believed to have been approved by him. It was in these words. "I have considered the test, and am very desirous of giving obedience as far as I can. I am confident that the parliament never intended to impose contradictory oaths: therefore I think no man can explain it but for himself. Accordingly I take it as far as it is consistent with itself and the Protestant religion. And I do declare that I mean not to bind myself, in my litation, and in a lawful way, from wishing and endeavouring any alteration, which I think to the advantage of church or state, and not repugnant to the Protestant religion and my loyalty: and this I understand as a part of my oath." The duke, as was natural, heard it with great tranquillity: no one took the least offence: Argyle was admitted to sit that day in council: and it was impossible to imagine that a capital offence had been committed where occasion seemed not to have been given so much as for a frown or reprimand.

Argyle was much surpris'd a few days after, to find that a warrant was issued for committing him to prison; that he was indicted for high treason, leasing-making, and perjury; and that from the innocent words above-mentioned an accusation was extracted, by which he was to forfeit life, honours, and fortune. It is needless to enter into particulars, where the iniquity of the whole is so evidently apparent. Though the sword of justice was displayed, even her semblance was not put on; and the forms of law were preserved to sanctify, or rather aggravate, the oppression. Of five judges, three did not scruple to find the guilt of treason and leasing-making to be incurred by the prisoner: a jury of 15 noblemen gave verdict against him; and the king being consulted, ordered the sentence to be pronounced, but the execution of it to be suspended till further orders. Argyle, however, saw no reason to trust to the justice or mercy of such enemies: He made his escape from prison, and till he could find a ship for Holland he concealed himself during some time in London. The king heard of his lurking place, but would not suffer him to be arrested. All the parts, however, of his sentence, so far as the government in Scotland had power, were rigorously executed; his estate confiscated, his arms reversed and torn. Having got over to Holland, he remained there during the remaining part of the reign of Charles II. But thinking himself at liberty, before the coronation of James II. to exert him-

Campbell.

self in order to recover the constitution by force of arms, he concerted measures with the duke of Monmouth, and went into Scotland, to assemble his friends: but not meeting with the success he expected, he was taken prisoner; and being carried to Edinburgh, was beheaded upon his former unjust sentence, June 30, 1685. He shewed great constancy and courage under his misfortunes: on the day of his death he ate his dinner very cheerfully; and, according to his custom, slept after it a quarter of an hour or more, very soundly. At the place of execution he made a short, grave, and religious speech; and, after solemnly declaring that he forgave all his enemies, submitted to death with great firmness.

CAMPBELL (John), duke of Argyle and Greenwich, grandson of the former, was born on the 10th of October, 1680; and, on the very day when his grandfather suffered at Edinburgh, fell out of a window three pair of stairs high, without receiving any hurt. At the age of 15, he had made a considerable progress in classical learning. His father then perceived and encouraged his military disposition, and introduced him to king William, who in the year 1694 gave him the command of a regiment. In this situation he remained till the death of his father, in 1703; when becoming duke of Argyle, he was soon after sworn of queen Anne's privy-council, made captain of the Scotch horseguards, and appointed one of the extraordinary lords of session. In 1704, her majesty reviving the Scottish order of the thistle, his grace was installed one of the knights of that order, and was soon after appointed high-commissioner to the Scotch parliament; where, being of great service in promoting the intended union, he was on his return created a peer of England, by the titles of *baron of Chatham* and *earl of Greenwich*, and in 1710 was made knight of the garter. His grace first distinguished himself in his military capacity at the battle of Oudenard; where he commanded as brigadier-general, with all the bravery of youth, and the conduct of a veteran officer. He was present under the duke of Marlborough at the siege of Ghent, and took possession of the town. He had also a considerable share in the victory obtained over the French at the battle of Malplaquet, by dislodging them from the wood of Sart, and gaining a post of great consequence. In this sharp engagement, several musket-balls passed through the duke's cloaths, hat, and peruke. Soon after this hot action, he was sent to take the command in Spain; and after the reduction of Port Mahon, he returned to England. His grace having now a seat in the house of lords, he censured the measures of the ministry with such freedom, that all his places were disposed of to other noblemen: but at the accession of George I. he recovered his influence. At the breaking out of the rebellion in 1715, he was made commander in chief of his majesty's forces in North Britain; and was the principal means and cause of the total extinction, at that time, of the rebellion in Scotland, without much bloodshed. In direct opposition to him, or that part of the army he commanded, at the head of all his Campbells was placed Campbell earl of Braidalbin, of the same family and kindred, by some fatal error that ever misguided and misled that unhappy family of the Stewarts and all its adherents. The consequence was, that both sets of Campbells, from family affection,

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Campbell. tion, refused to strike a stroke, and retired out of the battle. He arrived at London March 6th 1716, and was in high favour; but, to the surprise of people of all ranks, he was in a few months divested of all his employments; and from this period, to the year 1718, he signalized himself in a civil capacity, by his uncorrupted patriotism and manly eloquence. In the beginning of the year 1719, he was again admitted into favour, appointed lord-steward of the household, and in April following was created duke of Greenwich. He continued in the administration during all the remaining part of that reign; and, after his late majesty's accession, till April 1740; when he delivered a speech with such warmth, that, the ministry being highly offended, he was again dismissed from his employments. To these, however, on the change of the ministry, he was soon restored; but not approving of the measures of the new ministry more than those of the old, he gave up all his posts for the last time, and never after engaged in affairs of state. He now enjoyed privacy and retirement; and died of a paralytic disorder, on the 4th of October 1743. To the memory of his grace a very noble monument was erected in Westminster-abbey, executed by the ingenious Rouilliac.

The duke of Argyle, though never first minister, was a very able statesman and politician, most steadily fixed in those principles he believed to be right, and not to be shaken or changed. His delicacy and honour were so great, that it hurt him to be even suspected; witness that application said to be made to him by one of the adherents of the Stewart family before the last rebellion in order to gain his interest, which was considerable both in Scotland and England. He immediately sent the letter to the secretary of state; and it vexed him much even to have an application made him, lest any person should think him capable of acting a double part. When he thought measures wrong or corrupt, he cared not who was the author, however great or powerful he might be; witness his boldly attacking the great duke of Marlborough in the house of lords, about his forage and army contracts in Flanders, in the very zenith of his power and popularity, though in all other respects he was the most able general of his time. The duke of Argyle, on all occasions, spoke well, with a firm, manly, and noble eloquence; and seems to deserve the character given of him by Pope:

Argyle the state's whole thunder born to wield,
And shake alike the senate and the field.

CAMPBELL (Dr John), a late writer, who distinguished himself by many esteemed literary productions; particularly as the author of a considerable part of *The ancient and modern universal history*, and of the *Biographia Britannica*. He wrote also *The present state of Europe*; *The lives of the English admirals*; and an ingenious whimsical tract on the means of attaining extraordinary longevity, entitled *Hermippus redeivous*. The public are likewise indebted to him for a much improved edition of *Harri's collection of voyages*. But his principal and favourite work was, *A political survey of Great Britain*, 2 vols 4to, published a short time before his death; in which the extent of his knowledge, and his patriotic spirit, are equally conspicuous. He was, during the latter part of his life, agent for the province

of Georgia in North America; and died at the close of the year 1775, in the 67th year of his age.

CAMPBELLTOWN, a parliament town of Argyleshire in Scotland, seated on the lough of Kilkerran, on the eastern shore of Kintyre, of which it is the capital. It hath a good harbour; and is now a very considerable place, having risen from a petty fishing town to its present flourishing situation in less than 30 years. About the year 1744, it had only two or three small vessels belonging to the port; but in 1772, there were 78 sail from 20 to 80 tons burthen, all built for, and employed in, the herring-fishery; and about 800 sailors were employed to man them. The inhabitants are reckoned to be upwards of 7000 in number. W. Long. 5. 10. N. Lat. 54.

CAMPDEN, a poor town of Gloucestershire in England, containing about 200 houses. It gives title to a viscount, and sends two members to parliament. W. Long. 1. 50. N. Lat. 52.

CAMPEACHY, a town of Mexico in South America, seated on the east coast of a bay of the same name, on the west of the province of Yucator. It is defended by a good wall and strong forts; but is neither so rich, nor carries on such a trade, as formerly; it having been the port for the sale of logwood, the place where it is cut being about 30 miles distant. It was taken by the English in 1596; by the bucaners in 1678; and by the Filibusters of St Domingo in 1685, who set it on fire, and blew up the citadel. W. Long. 93. 7. N. Lat. 19. 20.

CAMPEACHY-Wood, in botany. See HEMATOXYLUM.

CAMPEN, a strong town of Overysel in the United Provinces. It hath a citadel and a harbour; but the latter is almost choked up with sand. It was taken by the Dutch in 1578, and by the French in 1672; but they abandoned it the following year. It is seated near the mouth of the river Yssel and Zuider See. E. Long. 5. 35. N. Lat. 52. 38.

CAMPHORA, or CAMPHIRE, a solid concrete juice extracted from the wood of the laurus camphora*.

Pure camphire is very white, pellucid, somewhat unctuous to the touch; of a bitterish aromatic taste, yet accompanied with a sense of coolness; of a very fragrant smell, somewhat like that of rosemary, but much stronger. It has been very long esteemed one of the most efficacious diaphoretics; and has been celebrated in fevers, malignant and epidemical distempers. In deliria, also, where opiates could not procure sleep, but rather aggravated the symptoms, this medicine has often been observed to procure it. All these effects, however, Dr Cullen attributes to its sedative property, and denies that camphire has any other medicinal virtues than those of an antispasmodic and sedative. He allows it to be very powerful, and capable of doing much good or much harm. From experiments made on different brute creatures, camphire appears to be poisonous to every one of them. In some it produced sleep followed by death, without any other symptom. In others, before death, they were awakened into convulsions and rage. It seems, too, to act chiefly on the stomach; for an entire piece swallowed, produced the abovementioned effects with very little diminution of weight.

CAMPI (Bernardine) of Cremona, an Italian paint-

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Campi.

* See Laurus; Chemist's try, n^o 490; and Materia Medica, n^o 198.

Campion, er, author of an admired treatise on the art, flourished in the 12th century.

CAMPION (Edmund), an English Jesuit, was born at London, of indigent parents, in the year 1540; and educated at Christ's hospital, where he had the honour to speak an oration before queen Mary on her accession to the throne. He was admitted a scholar of St John's college in Oxford at its foundation, and took the degree of master of arts in 1564. About the same time he was ordained by a bishop of the church of England, and became an eloquent Protestant preacher. In 1566, when queen Elizabeth was entertained by the university of Oxford, he spoke an elegant oration before her majesty, and was also respondent in the philosophy act in St Mary's church. In 1568, he was junior professor of the university. In the following year, he went over to Ireland, where he wrote a history of that kingdom, and turned papist; but being found rather too assiduous in persuading others to follow his example, he was committed to prison. He soon, however, found means to make his escape. He landed in England in 1571; and thence proceeded to Doway in Flanders, where he publicly recanted his former heresy, and was created bachelor of divinity. He went soon after to Rome, where, in 1573, he was admitted of the society of Jesus, and was sent by the general of that order to Vienna, where he wrote his tragedy called *Neciar et ambrosia*, which was acted before the emperor with great applause.

From Vienna he went to Prague in Bohemia, where he resided in the Jesuits college about six years, and then returned to Rome. From thence, in 1580, he was sent by Pope Gregory XIII. with the celebrated Father Parsons, to convert the people of England. From Pitts we learn, that, some time before, several English priests, inspired by the Holy Ghost, had undertaken to convert their countrymen; that 80 of these foreign seminaries, besides several others who by God's grace had been converted in England, were actually engaged in the pious work with great success; that some of them had suffered imprisonment, chains, tortures, and ignominious death, with becoming constancy and resolution: but seeing at last that the labour was abundant, and the labourers few, they solicited the assistance of the Jesuits; requesting, that, though not early in the morning, they would at least in the third, sixth, or ninth hour, send labourers into the Lord's vineyard. In consequence of this solicitation, the above two were sent to England. They arrived, in an evil hour for Campian, at Dover; and were next day joyfully received by their friends at London. He had not been long in England, before Walsingham the secretary of state, being informed of his uncommon assiduity in the cause of the church of Rome, used every means in his power to have him apprehended, but for a long time without success. However, he was at last taken by one Elliot, a noted priest-taker, who found him in the house of Edward Yates, Esq; at Lyford in Berkshire, and conducted him in triumph to London, with a paper on his hat, on which was written *Campion the Jesuit*. He was imprisoned in the Tower; where, Wood says, "he did undergo many examinations, abuses, wrackings, tortures;" *exquisitisque cruciatibus tortus*, says Pitts. It is hoped, for the credit of our reformers, this torturing part of the story is not true. The poor wretch, how-

ever, was condemned, on the statute 25 Ed. III. for high treason; and butchered at Tyburn, with two or three of his fraternity. Howsoever criminal in the eye of the law, or of the English gospel, might be the zeal of this Jesuit for the salvation of the poor heretics of this kingdom, biographers of each persuasion unite in giving him a great and amiable character. "All writers (says the Oxford antiquary), whether Protestant or Popish, say, that he was a man of most admirable parts; an elegant orator, a subtle philosopher and disputant, and an exact preacher whether in English or the Latin tongue, of a sweet disposition, and a well-polished man." Fuller, in his church-history, says, "he was of a sweet nature, constantly carrying about him the charms of a plausible behaviour, of a fluent tongue, and good parts." His History of Ireland, in two books, was written in 1570; and published, by Sir James Ware, from a manuscript in the Cotton library, Dublin, 1633, folio. He wrote also *Chronologia universalis*, a very learned work; and various other tracts.

CAMPION, in botany, the English name of the LYCHNIS.

CAMPION, a town of the kingdom of Tanguth in Tartary. It was formerly remarkable for being a place through which the caravans passed in the road from Bukharia to China. E. Long. 104.53. N. Lat. 40.25.

CAMPISTRON, a celebrated French dramatic author, was born in 1656. Racine directed his poetical talents to the theatre, and assisted him in his first pieces. He died in 1723.

CAMPLI, or CAMPOLI, a town of Italy, in the kingdom of Naples, and in the farther Abruzzo, situated in E. Long. 13.55. N. Lat. 42.38.

CAMPO MAJOR, a town of the province of Alentejo in Portugal. W. Long. 7.24. N. Lat. 38.50.

CAMPREDON, a town of Catalonia in Spain, seated at the foot of the Pyrenean mountains. The fortifications were demolished by the French in 1691. W. Long. 1.56. N. Lat. 42.20.

CAMPS (Francis de), abbot of Notre Dame at Sigi, was born at Amiens in 1643; and distinguished himself by his knowledge of medals, by writing an history of France, and several other works. He died at Paris in 1723.

CAMPUS, in antiquity, a field or vacant plain in a city, not built upon, left vacant on account of wars, combats, exercises, or other uses of the citizens.

CAMPUS Maii, in ancient customs, an anniversary assembly of our ancestors held on May-day, when they confederated together for defence of the kingdom against all its enemies.

CAMPUS Martius, a large plain in the suburbs of ancient Rome, lying between the Quirinal and Capitoline mounts and the Tiber, thus called because consecrated to the god Mars, and set apart for military sports and exercises to which the Roman youth were trained, as the use and handling of arms, and all manner of feats of activity. Here were the races run, either with chariots or single horses; here also stood the villa publica, or palace for the reception of ambassadors, who were not permitted to enter the city. Many of the public comitia were held in the same field, part of which was for that purpose cantoned out. The place was also nobly decorated with statues, arches, columns, porticoes, and the like structures.

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CAMPUS *Sceleratus*, a place without the walls of ancient Rome, where the Vestals who had violated their vows of virginity were buried alive.

CAMUL, a town of Asia, on the eastern extremity of the kingdom of Cialus, on the frontiers of Tangut. E. Long. 98. 5. N. Lat. 37. 15.

CAMUS, a person with a low flat nose, hollowed in the middle.

The Tartars are great admirers of camus beauties. Rubruquis observes, that the wife of the great Jenghiz Khan, a celebrated beauty, had only two holes for a nose.

CAMUS (John Peter), a French prelate born in 1582. He was author of a number of pious romances (the taste of his time), and other theological works, to the amount of 200 vols. His definition of politics is remarkable: *Arts non tam regendi, quam fallendi, homines; "the art not so much of governing, as of deceiving, mankind."* He died in 1652.

CAN, in the sea-language, as can-pump, a vessel wherewith seamen pour water into the pump to make it go.

CAN-Buoy. See BUOY.

CAN-Hook, an instrument used to sling a cask by the ends of the staves: it is formed by fixing a broad and flat hook at each end of a short rope; and the tackle by which the cask so slung may be hoisted or lowered, is hooked to the middle of the rope.

CANADA, or the province of Quebec, an extensive country of North America, bounded on the north-east by the gulph of St Lawrence, and St John's river; on the south-west, by lands inhabited by the savage Indians, which are frequently included in this province; on the south, by the provinces of Nova Scotia, New England, and New York; and on the north-west, by other Indian nations. Under the name of *Canada*, the French comprehended a very large territory; taking into their claim part of New Scotland, New England, and New York on the east; and extending it on the west as far as the Pacific Ocean. That part, however, which was reduced by the British arms in the last war, lies between 61 and 81 degrees of west longitude, and between 45 and 52 of north latitude. The climate is not very different from that of the northern British colonies; but as it is much further from the sea, and more to the northward, than most of those provinces, it has a much severer winter, though the air is generally clear; and, like most of those American tracts that do not lie too far to the northward, the summers are very hot, and exceeding pleasant. The soil in general is very good, and in many parts extremely fertile; producing many different sorts of grains, fruits, and vegetables. The meadow grounds, which are well watered, yield excellent grass, and breed vast numbers of great and small cattle. The uncultivated parts are a continued wood, composed of prodigiously large and lofty trees, of which there is such a variety of species, that even of those who have taken most pains to know them, there is not perhaps one that can tell half the number. Canada produces, among others, two sorts of pines, the white and the red; four sorts of firs; two sorts of cedar and oak, the white and the red; the male and female maple; three sorts of ash-trees, the free, the mungrel, and the bastard; three sorts of walnut-trees, the hard, the soft, and the smooth; vast

numbers of beech-trees and white wood; white and red elms, and poplars. The Indians hollow the red elms into canoes, some of which made out of one piece will contain 20 persons; others are made of the bark; the different pieces of which they sew together with the inner rind, and daub over the seams with pitch, or rather a bituminous matter resembling pitch, to prevent their leaking; the ribs of these canoes are made of boughs of trees. In the hollow elms, the bears and wild cats take up their lodging from November to April. The country produces also a vast variety of other vegetables, particularly tobacco, which thrives well. Near Quebec is a fine lead mine, and many excellent ones of iron have been discovered. It hath also been reported that silver is found in some of the mountains. The rivers are extremely numerous, and many of them very large and deep. The principal are, the Ouattauais, St John's, Seguinay, Despaires, and Trois Rivieres; but all these are swallowed up by the great river St Lawrence. This river issues from the lake Ontario; and, taking its course north-east, washes Montreal, where it receives the Ouattauais, and forms many fertile islands. It continues the same course, and meets the tide upwards of 400 miles from the sea, where it is navigable for large vessels; and below Quebec, 320 miles from the sea, it becomes so broad and so deep, that ships of the line contributed in the last war to reduce that city. After receiving in its progress innumerable streams, it at last falls into the ocean at cape Rosiers, where it is 90 miles broad, and where the cold is intense and the sea boisterous. This river is the only one upon which any settlements of note are as yet formed; but it is very probable, that, in time to come, Canada, and those vast regions to the west, may be enabled of themselves to carry on a considerable trade upon the great lakes of fresh water which these countries environ. Here are five lakes, the least of which is of greater extent than the fresh-water lakes to be found in any other part of the world: these are the lake Ontario, which is not less than 200 leagues in circumference; Erie, or Oswego, longer but not so broad, is about the same extent. That of the Huron spreads greatly in width, and is about 300 leagues in circuit; as also is that of Michigan, though like lake Erie it is rather long, and comparatively narrow. But the lake Superior is larger than any of these, being not less than 500 leagues in circumference. All these are navigable by any vessels, and they all communicate with each other; but the passage between Erie and Ontario is interrupted by a most stupenduous fall or cataract, called the *falls of Niagara* *. The river St Lawrence, as already observed, is the outlet of these lakes, by which they discharge themselves into the ocean. The French built forts at the several straits by which the lakes communicate with one another, and on that where the last of them communicates with the river. By these, while the country was in their possession, they effectually secured to themselves the trade of the lakes, and preserved an influence over all the Indian nations that lie near them.

The most curious and interesting part of the natural history of Canada is the animals there produced. These are stags, elks, deer, bears, foxes, martins, wild cats, ferrets, weasels, large squirrels of a greyish hue, hares and rabbits. The southern parts, in particular, breed great

* See Niagara.

Canada.

Canada.

great numbers of wild bulls, divers sorts of roebucks, goats, wolves, &c. The marshes, lakes, and pools, with which this country abounds, swarm with otters and beavers, of which the white are highly valued, as well as the right black kind. A vast variety of birds are also to be found in the woods; and the river St Lawrence abounds with such quantities of fish, that it is affirmed by some writers, this would be a more profitable article than even the fur-trade.—There are in Canada a multitude of different Indian tribes: but these are observed to decrease in number where the Europeans are most numerous; owing chiefly to the immoderate use of spirituous liquors, of which they are excessively fond. Their manners and way of living we have already particularly described †. The principal towns are Quebec, Trois Rivières, and Montreal. The commodities required by the Canadians from Europe are, Wine, or rather rum; cloths, chiefly coarse; linen; and wrought iron. The Indian trade requires rum, tobacco, a sort of duff blankets, gums, powder, balls, and flints, kettles, hatchets, toys, and trinkets of all kinds. While the country was in possession of the French, the Indians supplied them with poultry; and the French had traders, who, like the original inhabitants, traversed the vast lakes and rivers in canoes, with incredible industry and patience, carrying their goods into the remotest parts of America, and among nations entirely unknown to us. These again brought the furs, &c. home to them, as the Indians were thereby habituated to trade with them. For this purpose, people from all parts, even from the distance of 1000 miles, came to the French fair at Montreal, which began in June, and sometimes lasted three months. On this occasion many solemnities were observed, guards were placed, and the governor assisted to preserve order in so great and various a concourse of savage nations. But sometimes great disorders and tumults happened; and the Indians frequently gave for a dram all that they were possessed of. It is remarkable, that many of these nations actually passed by the English settlement of Albany in New York, and travelled 200 miles further to Montreal, though they could have purchased the goods they wanted cheaper at the former.

Since Britain became possessed of Canada, our trade with that country has generally employed 34 ships and 400 seamen; their exports, at an average of three years, in skins, furs, ginseng, snake-root, capillaire, and wheat, amount to 150,000*l*. Their imports from Great Britain are computed at nearly the same sum. It will, however, be always impossible to overcome certain inconveniencies arising from the violence of the winter. This is so excessive from December to April, that the broadest rivers are frozen over, and the snow lies commonly from four to six feet deep on the ground, even in those parts of the country which lie three degrees south of London, and in the temperate latitude of Paris. Another inconvenience arises from the falls in the river St Lawrence below Montreal, which prevent ships from penetrating to that emporium of inland commerce. Our communication therefore with Canada, and the immense regions beyond it, will always be interrupted during the winter-season, until roads are formed that can be travelled without danger from the Indians. For these savage people often commit hostilities against us, without any previous notice; and frequently, without

any provocation, they commit the most horrid ravages for a long time with impunity.

Canada was undoubtedly discovered by Sebastian Cabot, the famous Italian adventurer, who failed under a commission from Henry VII. But though the English monarch did not think proper to make any use of this discovery, the French quickly attempted it; we have an account of their fishing for cod on the banks of Newfoundland, and along the sea-coast of Canada, in the beginning of the 16th century. About the year 1506, one Denys, a Frenchman, drew a map of the gulph of St Lawrence; and two years after, one Aubert, a ship-master of Dieppe, carried over to France some of the natives of Canada. As the new country, however, did not promise the same amazing quantities of gold and silver produced by Mexico and Peru, the French, for some years, neglected the discovery. At last, in the year 1523, Francis I. a sensible and enterprising prince, sent four ships, under the command of Verazani, a Florentine, to prosecute discoveries in that country. The particulars of this man's first expedition are not known. All we can learn is, that he returned to France, and next year he undertook a second. As he approached the coast, he met with a violent storm; however, he came so near as to perceive the natives on the shore, making friendly signs to him to land. This being found impracticable by reason of the surf upon the coast, one of the sailors threw himself into the sea; but, endeavouring to swim back to the ship, a surge threw him on shore without signs of life. He was, however, treated by the natives with such care and humanity, that he recovered his strength, and was allowed to swim back to the ship, which immediately returned to France. This is all we know of Verazani's second expedition. He undertook a third, but was no more heard of, and it is thought that he and all his company perished before he could form any colony. In 1534, one Jacques Cartier of St Maloes set sail under a commission from the French king, and on the 10th of May arrived at Cape Bonavista in Newfoundland. He had with him two small ships besides the one in which he sailed. He cruised along the coasts of that island, on which he discovered inhabitants, probably the Eskimaux. He landed in several places along the coast of the Gulf, and took possession of the country in the king's name. On his return, he was again sent out with a commission, and a pretty large force: he returned in 1535, and passed the winter at St Croix; but the season proved so severe, that he and his companions must have died of the scurvy, had they not, by the advice of the natives, made use of the decoction of the tops and bark of the white pines. As Cartier, however, could produce neither gold nor silver, all that he could say about the utility of the settlement was disregarded; and in 1540, he was obliged to become pilot to one M. Roberval, who was by the French king appointed viceroy of Canada, and who sailed from France with five vessels. Arriving at the gulph of St Lawrence, they built a fort; and Cartier was left to command the garrison in it, while Roberval returned to France for additional recruits to his new settlement. At last, having embarked in 1549, with a great number of adventurers, neither he nor any of his followers were heard of more.

This fatal accident so greatly discouraged the court

† See America, no 29
—41.

of France, that, for 50 years, no measures were taken for supplying with necessaries the settlers that were left. At last, Henry IV. appointed the Marquis de la Roche lieutenant-general of Canada and the neighbouring countries. In 1598 he landed on the isle of Sable, which he absurdly thought to be a proper place for a settlement, though it was without any port, and without product except briars. Here he left about 40 malefactors, the refuse of the French jails. After cruising for some time on the coast of Nova Scotia, without being able to relieve these poor wretches, he returned to France, where he died of a broken heart. His colony must have perished, had not a French ship been wrecked on the island, and a few sheep driven upon it at the same time. With the boards of the ship they erected huts; and while the sheep lasted they lived on them, feeding afterwards on fish. Their clothes wearing out, they made coats of seal-skins; and in this miserable condition they spent seven years, when Henry ordered them to be brought to France. The king had the curiosity to see them in their seal-skin dresses, and was so moved with their appearance, that he forgave them all their offences, and gave each of them 50 crowns to begin the world anew.

In 1600, one Chauvin, a commander in the French navy, attended by a merchant of St Malo, called *Pontgrave*, made a voyage to Canada, from whence he returned with a very profitable quantity of furs. Next year he repeated the voyage with the same good fortune, but died while he was preparing for a third. The many specimens of profit to be made by the Canadian trade, at last induced the public to think favourably of it. An armament was equipped, and the command of it given to Pontgrave, with powers to extend his discoveries up the river St Lawrence. He failed in 1603, having in his company Samuel Champlain, who had been a captain in the navy, and was a man of parts and spirit. It was not, however, till the year 1608, that the colony was fully established. This was accomplished by founding the city of Quebec, which from that time commenced the capital of all the settlements in Canada. The colony, however, for many years continued in a low way, and was often in danger of being totally exterminated by the Indians. As the particulars of these wars, however, could neither be entertaining, nor indeed intelligible, to many of our readers, we choose to omit them, and in general observe, that the French not only concluded a permanent peace with the Indians, but so much ingratiated themselves with them, that they could with the greatest ease prevail upon them at any time to murder and scalp the English in their settlements. These practices had a considerable share in bringing about the last war with France, when the whole country was conquered by the British in 1761. The most remarkable transaction in this conquest was the siege of QUEBEC; for a particular account of which, see that article.

CANAL of COMMUNICATION, an artificial cut in the ground, supplied with water from rivers, springs, &c. in order to make a navigable communication between one place and another.

The particular operations necessary for making artificial navigations depend upon a number of circumstances. The situation of the ground; the vicinity or connection with rivers; the ease or difficulty with which a

proper quantity of water can be obtained; these and many other circumstances necessarily produce great variety in the structure of artificial navigations, and augment or diminish the labour and expence of executing them. When the ground is naturally level, and unconnected with rivers, the execution is easy, and the navigation is not liable to be disturbed by floods: but, when the ground rises and falls, and cannot be reduced to a level, artificial methods of raising and lowering vessels must be employed; which likewise vary according to circumstances.

A kind of temporary sluices are sometimes employed for raising boats over falls or shoals in rivers by a very simple operation. Two posts or pillars of mason-work, with grooves, are fixed, one on each bank of the river, at some distance below the shoal. The boat having passed these posts, planks are let down across the river by pulleys into the grooves, by which the water is dammed up to a proper height for allowing the boat to pass up the river over the shoal.

The Dutch and Flemings at this day, sometimes when obstructed by cascades, form an inclined plane or rolling-bridge upon dry land, along which their vessels are drawn from the river below the cascade into the river above it. This, it is said, was the only method employed by the ancients, and is still used by the Chinese, who are said to be entirely ignorant of the nature and utility of locks. These rolling-bridges consist of a number of cylindrical rollers which turn easily on pivots, and a mill is commonly built near by, so that the same machinery may serve the double purpose of working the mill and drawing up vessels.

A Lock is a basin placed lengthwise in a river or canal, lined with walls of masonry on each side, and terminated by two gates, placed where there is a cascade or natural fall of the country; and so constructed, that the basin being filled with water by an upper sluice to the level of the waters above, a vessel may ascend thro' the upper gate; or the water in the lock being reduced to the level of the water at the bottom of the cascade, the vessel may descend through the lower gate; for when the waters are brought to a level on either side, the gate on that side may be easily opened. But as the lower gate is strained in proportion to the depth of water it supports, when the perpendicular height of the water exceeds 12 or 13 feet, more locks than one become necessary. Thus, if the fall be 17 feet, two locks are required, each having 8½ feet fall; and if the fall be 26 feet, three locks are necessary, each having 8 feet 8 inches fall. The side-walls of a lock ought to be very strong. Where the natural foundation is bad, they should be founded on piles and platforms of wood: they should likewise slope outwards, in order to resist the pressure of the earth from behind.

Plate LXIX. fig. 1. A perspective view of part of a canal: the vessel L, within the lock A C.—Fig. 2. Section of an open lock: the vessel L about to enter.—Fig. 3. Section of a lock full of water; the vessel L raised to a level with the water in the superior canal.—Fig. 4. Ground section of a lock. L, a vessel in the inferior canal. C, the under gate. A, the upper gate. G H, a subterraneous passage for letting water from the superior canal run into the lock. K F, a subterraneous passage for water from the lock, to the inferior

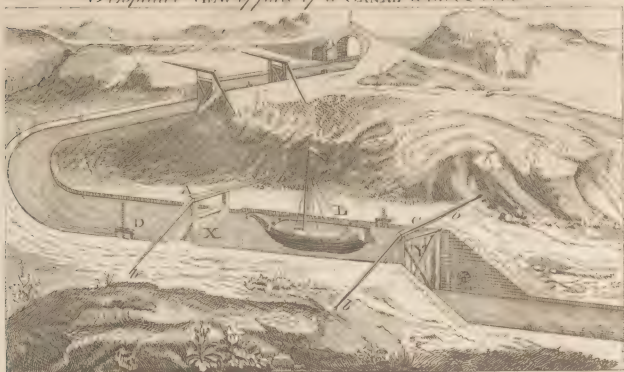


Fig. 2.
Section of a Lock



Fig. 3.
Section of a Lock full of Water

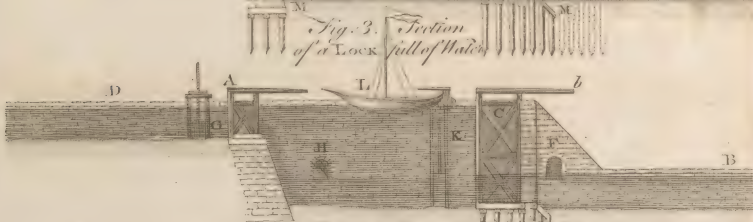
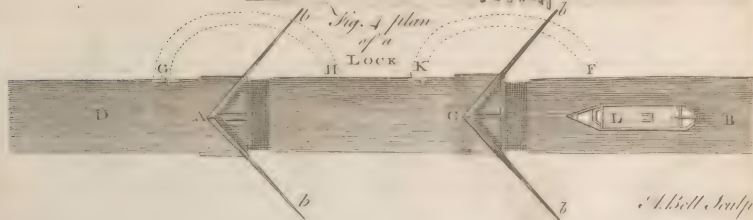


Fig. 4.
Plan of a Lock





Canal. rior canal.

Canal.

X and Y (fig. 1.) are the two flood-gates, each of which consists of two leaves, resting upon one another, so as to form an obtuse angle, in order the better to resist the pressure of the water. The first (X) prevents the water of the superior canal from falling into the lock; and the second (Y) dams up and sustains the water in the lock. These flood-gates ought to be very strong, and to turn freely upon their hinges. In order to make them open and shut with ease, each leaf is furnished with a long lever A b, A b; C b, C b. They should be made very tight and close, that as little water as possible may be lost.

By the subterraneous passage G H (fig. 2, 3, & 4) which descends obliquely, by opening the sluice G, the water is let down from the superior canal D, into the lock, where it is stoppt and retained by the gate C when shut, till the water in the lock comes to be on a level with the water in the superior canal D; as represented, fig. 3. When, on the other hand, the water contained by the lock is to be let out, the passage G H must be shut by letting down the sluice G, the gate A must be also shut, and the passage K F opened by raising the sluice K; a free passage being thus given to the water, it descends through K F, into the inferior canal, until the water in the lock is on a level with the water in the inferior canal B; as represented, fig. 2.

Now, let it be required to raise the vessel L (fig. 2) from the inferior canal B, to the superior one D; if the lock happens to be full of water, the sluice G must be shut, and also the gate A, and the sluice K opened, so that the water in the lock may run out till it is on a level with the water in the inferior canal B. When the water in the lock comes to be on a level with the water at B, the leaves of the gate C are opened by the levers C b, which is easily performed, the water on each side of the gate being in equilibrio; the vessel then sails in to the lock. After this the gate C and the sluice K are shut, and the sluice G opened, in order to fill the lock, till the water in the lock, and consequently the vessel, be upon a level with the water in the superior canal D; as is represented in fig. 3. The gate A is then opened, and the vessel passes into the canal D.

Again, let it be required to make a vessel descend from the canal D, into the inferior canal B. If the lock is empty, as in fig. 2. the gate C and sluice K must be shut, and the upper sluice G opened, so that the water in the lock may rise to a level with the water in the upper canal D. Then open the gate A, and let the vessel pass thro' into the lock. Shut the gate A and the sluice G; then open the sluice K, till the water in the lock be on a level with the water in the inferior canal; then the gate C is opened, and the vessel passes along into the canal B, as was required.

It is almost needless to spend time in enumerating the many advantages which necessarily result from artificial navigations. Their utility is now so apparent, that most nations in Europe give the highest encouragement to undertakings of this kind wherever they are practicable. The advantages of navigable canals did not escape the observation of the ancients. From the most early accounts of society we read of attempts to cut through large isthmuses, in order to make a communi-

cation by water, either betwixt different nations, or distant parts of the same nation, where land-carriage was long and expensive. Herodotus relates, that the Cnidians, a people of Caria in Asia Minor, designed to cut the isthmus which joins that peninsula to the continent; but were superstitious enough to give up the undertaking, because they were interdicted by an oracle. Several kings of Egypt attempted to join the Red-Sea to the Mediterranean. Cleopatra was exceedingly fond of this project. Soliman II. emperor of the Turks, employed 50,000 men in this great work. This canal was completed under the caliphate of Omar, but was afterwards allowed to fall into disrepair; so that it is now difficult to discover any traces of it. Both the Greeks and Romans intended to make a canal across the Isthmus of Corinth, which joins the Morea and Achaia, in order to make a navigable passage by the Ionian sea into the Archipelago. Demetrius, Julius Cæsar, Caligula, and Nero, made several unsuccessful efforts to open this passage. But, as the ancients were entirely ignorant of the use of water-locks, their whole attention was employed in making level cuts, which is probably the principal reason why they so often failed in their attempts. Charlemagne formed a design of joining the Rhine and the Danube, in order to make a communication between the ocean and the Black Sea, by a canal from the river Almutz which discharges itself into the Danube, to the Reditz, which falls into the Maine, and this last falls into the Rhine near Mayence: for this purpose he employed a prodigious number of workmen; but he met with so many obstacles from different quarters, that he was obliged to give up the attempt.

The French at present have many fine canals: that of Briare was begun under Henry IV. and finished under the direction of cardinal Richelieu in the reign of Lewis XIII. This canal makes a communication betwixt the Loire and the Seine by the river Loing. It extends 11 French great leagues from Briare to Montargis. It enters the Loire a little above Briare, and terminates in the Loing at Cepoi. There are 42 locks on this canal.

The canal of Orleans, for making another communication between the Seine and the Loire, was begun in 1675, and finished by Philip of Orleans, regent of France, during the minority of Lewis XV. and is furnished with 20 locks. It goes by the name of the *canal of Orleans*; but it begins at the village of Combleux, which is a short French league from the town of Orleans.

But the greatest and most useful work of this kind is the junction of the ocean with the Mediterranean by the canal of Languedoc. It was proposed in the reigns of Francis I. and Henry IV. and was undertaken and finished under Lewis XIV. It begins with a large reservoir 4000 paces in circumference, and 24 feet deep, which receives many springs from the mountain Noire. This canal is about 64 leagues in length, is supplied by a number of rivulets, and is furnished with 104 locks, of about eight feet rise each. In some places it passes over bridges of vast height; and in others it cuts thro' solid rocks for 1000 paces. At one end it joins the river Garonne near Tholouse, and terminates at the other in the lake Tau, which extends to the port of Cette. It was planned by Francis Riquet in the 1666, and finished

ed before his death, which happened in the 1680.

In the Dutch, Austrian, and French Netherlands, there is a very great number of canals; that from Bruges to Ostend carries vessels of 200 tons.

The Chinese have also a great number of canals; that which runs from Canton to Peking, extends about 825 miles in length, and was executed about 800 years ago.

It would be an endless task to describe the numberless canals in Holland, Russia, Germany, &c. We shall therefore confine ourselves to those that are either already finished, or at present executing, in our own country.

As the promoting of commerce is the principal intention of making canals, it is natural to expect that their frequency in any nation should bear some proportion to the trade carried on in it, providing the situation of the country will admit of them. The present state of England and Scotland confirms this observation. Though the Romans made a canal between the Nyne, a little below Peterborough, and the Witham, three miles below Lincoln, which is now almost entirely filled up, yet it is not long since canals were revived in England. They are now however become very numerous, particularly in the counties of York, Lincoln, and Cheshire. Most of the counties betwixt the mouth of the Thames and the Bristol channel are connected together either by natural or artificial navigations; those upon the Thames and Isis reaching within about 20 miles of those upon the Severn. The duke of Bridgewater's canal in Cheshire runs 27 miles on a perfect level; but at Barton it is carried by a very high aqueduct bridge over the Irwell, a navigable river; so that it is common for vessels to be passing at the same time both under and above the bridge. It is likewise cut some miles into the hills, where the Duke's coal-mines are wrought.

A communication betwixt the Forth and Clyde in Scotland, by a navigable canal, was projected as far back as the year 1722; and on a survey was reported to be practicable. No further notice, however, was taken of this project till the 3^d of December 1761, when the right honourable Francis lord Napier, at his own expence, employed Mr Mackell to make a survey, plan, and estimate thereof, on a very small scale; only capable of carrying lighters or barges, of about 10 or 12 tons burden.

In 1764, the trustees for fisheries, &c. in Scotland, employed Mr John Smeaton to make a survey, plan, and estimate of a canal of five feet depth of water. The expence of this canal was estimated at 78,970*l*. In 1766, Mr Mackell was employed to make another survey, plan, and estimate, of the abovementioned small canal. A number of the most respectable merchants in Glasgow joined in the subscription for it, which was soon filled up: an application was made to parliament; and after the bill was nearly obtained, an opposition was made by the east of Scotland, on account of the smallness of the scale; being only 24 feet medium breadth, by 4 feet depth of water. Upon this, the bill was given up; and a new subscription was set on foot for a canal of 7 feet deep, estimated at 147,337*l*.

Mr Smeaton being appointed principal engineer, and Mr Mackell resident engineer, the work was begun in June 1768; but with some deviation from the original plan, as to its origin and course. It begins at Grange-

burn foot, near the mouth of Carron, where they have a very good harbour called *Green Brae*, for large ships; there being 18 feet of water at the sea-lock, and at very high stream-tides 21 feet. It then proceeds westward three miles, till it comes abreast with the town of Falkirk, the ground rising so little that there are only six locks in that space; though in the fourth mile, which cost about 18,000*l*. there are no less than ten locks, and a very fine aqueduct bridge; under which the great road leading from Edinburgh, by Falkirk, to Glasgow and Stirling, passes: from the fourth mile, or 16th lock, to the east end of Dollator-bog, is six miles; and in that space there are only four locks and seven aqueduct bridges, two of which are considerable, besides small tunnels: at the east end of Dollator-bog, or tenth mile stone, is the 20th lock placed, which begins the canal of partition on the summit betwixt the east and west sea; and which canal of partition continues no less than 18 miles on a level, passing by the south side of Kirkintulloch, and terminates at Hamilton-hill, about a measured mile from Glasgow.

The carrying the canal through the Kerse below Falkirk was attended with little trouble in the digging, though the foundations of the six locks in that track were very troublesome; being in a quick soft mud: the carrying it through Dollator-bog, a soft mud of two miles in length, was attended with more difficulty, and was two years in executing, tho' drained as much as possible a year before the work began; and notwithstanding all this, a part had to be dragged to the depth, after the water was let in to hold down the bottom and prevent it from rising: however, that space is now one of the best parts of the whole canal. Round the point of the Stronhill, opposite to Kilsyth, the canal is banked on the north side for a considerable space above the surface of the ground about 20 feet high, and the water in that place is about 16 feet deep.

There were several places from that to Kirkintulloch to cut through free-stone rock a considerable depth; and at Kirkintulloch the canal is carried over the water of Logie on an aqueduct bridge, whose arch is 90 feet broad; which arch was thrown over in three different stretches, of 30 feet each, having only 30 feet of a centre, which was shifted on small rollers from one stretch to another. Though this was a thing new, and never attempted before with an arch of this size, yet the joinings are as fairly equal as any other part of the arch. This bridge is thought to be a very fine piece of masonry of its kind: on each side there is a very considerable banking over the valley in which the water runs, and which is made up with the soil taken out of a deep cut immediately adjoining thereto on the west side; which cut is not less than 250 yards long, and 42 feet deep.

About two miles west of this the canal goes for near half a mile thro' an open gravel, where it was thought impracticable to make it hold water, as the ground declines suddenly to the north at that place, facing the water of Kelvin; but from the precautions taken to secure that part after the canal was cut through, it proves remarkably tight.

About three miles west from that, the canal goes through the east verge of Polle Loch; and to the westward is cut for a considerable length through a free-stone rock, gray ribs, blaes, and soil on the top, about

Canal.

20 feet deep. About a mile and a half west of that, at a place called *Stockingfield*, the canal turns right to the south; and terminates at Hamilton-hill, within about a mile of Glasgow, where there is a commodious bafon or harbour fit to hold 20 loops at a time. The natural situation of this bafon or harbour, in point of convenience for building warehouses, loading and unloading goods, is acknowledged by every person who has seen it to be exceedingly commodious.

To supply this canal with water, is itself a very great work. The first supply is from a large reservoir formed a mile east of Kilfyth, and supplied with water from three of the feeders of the river Kelvin; which reservoir contains about 50 acres, and is upwards of 24 feet deep. The Kilfyth-burn is carried into this reservoir by an expensive aqueduct of about a mile in length, and the water from the reservoir is also conducted into the canal by an aqueduct cut for that purpose. The next supply is brought by a cut made from the water of Logie, about five miles above Kirkintulloch, to carry off the spare water therefrom, and which falls into the Shirva-burn, and is carried off from that by an aqueduct of about $\frac{1}{2}$ of a mile in length. The third supply is from the lakes that discharge themselves by the Muthland-burn; the water of all which is carried off by an aqueduct of about two miles in length, cut through a hill on the south-west side of Kirkintulloch, and carried into the canal at that place. The fourth supply is from Auchinloch and Loch Grog, carried into the canal by an aqueduct of about two miles in length, cut from near the mouth of the mine which drains Auchinloch, and falls into the canal at Park-burn, west of Kirkintulloch about a mile. There are several other supplies of less consequence; and were more thought necessary, or should become so when the canal is lock'd down to Clyde, a thing much wished for, there can be very great additional supplies got at a moderate expence.

In order to repay the river Kelvin for the feeders which are taken from it into the canal, a large reservoir is formed in Kilmanan-muir, about seven miles north of Glasgow; consisting of 70 acres and $\frac{1}{2}$ banked up at the sluice 22 feet deep. This is thought to be the finest artificial reservoir in Britain; and amply repays the Kelvin for any feeders that can be taken from it. The water of this reservoir is conveyed down the tract of the water of Allinder, which joins the river Kelvin above the uppermost mills built thereon, and supplies the whole in time of drought.

The surface of the water in the canal of partition on the summit betwixt the two seas, is 155 feet above the medium full-sea mark. There are 20 locks on the east side, 20 feet wide by 75 feet long, about 8 feet of rise of the summit; but 19 locks are sufficient on the west side, as the tide does not ebb so low in Clyde as in the Forth by about 9 feet: which make in all 39 locks. There are no less than 18 draw-bridges and 15 aqueduct-bridges of note; besides small ones and tunnels.

It is supposed there is now 150,000*l.* laid out upon this work. If the canal is continued from Stockingfield (where it now turns south to Glasgow), over the river Kelvin, where a great aqueduct bridge is required, and down to Clyde at or near Dalmuir-burn-foot, it is supposed the expence will be above 400,000*l.*

The trade has increased greatly since the canal was opened to Glasgow, and vessels from 30 to 60 tons bur-

den have found their way up it from all ports of the coasts of England and Scotland, in so much that it is thought that the revenues already * amount to about 6000*l.* and that they will still increase greatly.

CANAL, in anatomy, a duct or passage through which any of the juices flow.

CANANOR, a large maritime town of Afia, on the coast of Malabar, in a kingdom of the same name, with a very large and safe harbour. It formerly belonged to the Portuguese, and had a strong fort to guard it; but in 1683, the Dutch, together with the natives, drove them away; and after they became masters of the town, enlarged the fortifications. They have but a very small trade; but there is a town at the bottom of the bay independent of the Dutch, whose prince can bring 20,000 men into the field. The Dutch fort is large, and the governor's lodgings are at a good distance from the gate; so that when there was a skirmish between the factory and the natives, he knew nothing of it till it was over. E. Long. 78. 10. N. Lat. 12. 0.

CANANOR, a small kingdom of Afia, on the coast of Malabar, whose king can raise a considerable army. The natives are generally Mahometans; and the country produces pepper, cardamons, ginger, mirobolans, and tamarinds, in which they drive a considerable trade.

CANARA, a kingdom of Afia, on the coast of Malabar. The inhabitants are Gentoos, or Pagans; and there is a pagod, or temple, called *Ramtrut*, which is visited every year by a great number of pilgrims. Here the custom of burning the wives with their husbands had its beginning, and is practised to this day. The country is generally governed by a woman who keeps her court at a town called *Baydor*, two days journey from the sea. She may marry whom she pleases; and is not obliged to burn with her husband, like her female subjects. They are so good observers of their laws, that a robbery or murder is scarce ever heard of among them. The Canarans have forts built of earth along the coast, which are garrisoned with 200 or 300 soldiers, to guard against the robberies of their neighbours. The lower grounds yield every year two crops of corn or rice; and the higher produce pepper, betel nuts, sanders wood, iron, and steel. The Portuguese clergy here live very loosely, and make no scruple of procuring women for strangers.

CANARIA (anc. geog.), one of the Fortunate Islands, a proof that these were what are now called the *Canaries*. Canaria had its name from its abounding with dogs of an enormous size, two of which were brought to Juba king of Mauritania. See the following article.

CANARIA, or the GRAND CANARY, an island in the Atlantic Ocean, about 180 miles from the coast of Africa. It is about 100 miles in circumference, and 33 in diameter. It is a fruitful island, and famous for the wine that bears its name. It also abounds with apples, melons, oranges, citrons, pomegranates, figs, olives, peaches, and plantains. The fir and palm trees are the most common. The towns are, Canary the capital, Gualdera, and Geria.

CANARY, or CIVIDAD DE PALMAS, is the capital of the island of Canaria, with an indifferent castle, and a bishop's see. It has also a court of inquisition, and the supreme council of the rest of the Canary-islands; as also four convents, two for men, and two for women.

Cananor

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Canaria.

* First year.

Canary. men. The town is about three miles in compass, and contains 12,000 inhabitants. The houses are only one story high, and flat at the top; but they are well built. The cathedral is a handsome structure. W. Long. 15. 20. N. Lat. 28. 4.

CANARY-ISLANDS, are situated in the Atlantic ocean, over against the empire of Morocco in Africa. They were formerly called the *Fortunate Islands*, on account of the temperate healthy air, and excellent fruits. The land is very fruitful, for both wheat and barley produce 130 for one. The cattle thrive well, and the woods are full of all sorts of game. The Canary singing birds are well known all over Europe. There are here sugar-canes in great abundance; but the Spaniards first planted vines here, from whence we have the wine called *Canary or Sack*.

These islands were not entirely unknown to the ancients; but they were a long while forgot, till John de Betencourt discovered them in 1402. It is said they were first inhabited by the Phœnicians, or Carthaginians, but on no certain foundation; nor could the inhabitants themselves tell from whence they were derived; on the contrary, they did not know there was any other country in the world. Their language, manners, and customs, had no resemblance to those of their neighbours. However, they were like the people on the coast of Barbary in complexion. They had no iron. After the discovery, the Spaniards soon got possession of them all, under whose dominions they are to this day, except Madeira, which belongs to the Portuguese. The inhabitants are chiefly Spaniards; though there are some of the first people remaining, whom they call *Guanches*, who are somewhat civilized by their intercourse with the Spaniards. They are a hardy, active, bold people, and live on the mountains. Their chief food is goat's milk. Their complexion is tawny, and their noses flat. The Spanish vessels, when they sail for the West Indies, always rendezvous at these islands, going and coming. Their number is 12. 1. Alegranza; 2. Canaria; 3. Ferro; 4. Fuerteventura; 5. Gomera; 6. Gratiotia; 7. Lancerotta; 8. Madera; 9. Palma; 10. Rocca; 11. Salvages; 12. Teneriff. West longitude from 12. to 21. north latitude from 27. 30. to 29. 30.

CANARY-BIRD. See FRINGILLA. These birds are much admired for their singing, and take their name from the place from whence they originally came, viz. the Canary-islands; but of late years there is a sort of birds brought from Germany, and especially from Tirol, and therefore called *German birds*, which are much better than the others; though both are supposed to have originally come from the same place. The cocks never grow fat, and by some country people cannot be distinguished from common green-birds; though the Canary-birds are much lustier, have a longer tail, and differ much in the heaving of the passages of the throat when they sing. These birds being so much esteemed for their song, are sometimes sold at a high price, according to the goodness and excellency of their notes; so that it will be always advisable to hear one sing before he is bought. In order to know whether he is in good health, take him out of the store-cage, and put him in a clean cage by himself: if he stand up boldly, without crouching or shrinking in his feathers, look with a brisk eye, and is not subject to clap his head

under his wing, it is a sign that he is in good health; but the greatest matter is to observe his dunging: if he bolts his tail like a nightingale after he has dunged, it is a sign he is not in good health, or at least that he will soon be sick; but if his dung be very thin like water, or of a slimy white without any blackness in it, it is a sign of approaching death. When in perfect health, his dung lies round and hard, with a fine white on the outside, dark within, and dries quickly; though a feed-bird seldom dungs so hard, unless he is very young.

Canary-birds are subject to many diseases, particularly imposthumes, which affect the head, cause them to fall suddenly from the perch, and die in a short time, if not speedily cured. The most approved medicine is an ointment made of fresh butter and capon's grease melted together. With this the top of the bird's head is to be anointed for two or three days, and it will dissolve the imposthume: but if the medicine has been too long delayed, then, after three or four times anointing, see whether the place of his head be soft; and if so, open it gently, and let out the matter, which will be like the yolk of an egg; when this is done, anoint the place, and the bird will be cured. At the same time he must have figs with his other food, and in his water a slice or two of liquorice, with white sugar-candy.

Some are so curious as to breed these birds in Britain; and these have excelled all others. Such of the Canary-birds as are above three years old are called *runts*; those above two, are called *crisses*; those of the first year that the old ones bring up, are called *branchers*; those that are new-fledged and cannot feed themselves, are called *puffers*; and those that are bred up by hand, *nestlings*.

CANCALIE, a town of France, in Upper Brittany, by the sea-side, where there is a road. Here the British landed in 1758, in their way to St Malo, where they burnt a great number of ships in the harbour, and then retired without loss. This town was in their power; but they acted like generous enemies, and did no hurt to this nor any other on the coast. W. Long. 0. 13. N. Lat. 48. 41.

CANCELIER, in falconry, is when a light brown hawk, in her stooping, turns two or three times upon the wing, to recover herself before she seizes.

CANCELLI, a term used to denote lattice windows, or those made of cross-bars, disposed latticewise; it is also used for rails or ballusters inclosing the communion-table, a court of justice, or the like, and for the network in the inside of hollow bones.

CANCELLING, in the civil law, an act whereby a person consents that some former deed be rendered null and void. This is otherwise called *rescission*. The word comes from the Latin *cancellare* to encompass or pale a thing round. In the proper sense of the word, to cancel, is to deface an obligation, by passing the pen from top to bottom, or across it; which makes a kind of chequer lattice, which the Latins call *cancelli*.

CANCER, in zoology, a genus of insects belonging to the order of insecta aptera. The generic characters are these: they have eight legs, (sceldom ten or six), besides the two large claws which answer the purpose of hands. They have two eyes at a considerable distance from each other, and for the most part supported by a kind of pedunculi or footstalks; the eyes are likewise elongated and moveable; they have two clawed

Canary,
Can. cr.
Sportiman's
Dictionary.

Cancer, or
Crab, &c.

clawed palpi, and the tail is jointed. This genus includes the lobster, shrimp, &c. There are no less than 87 species of cancer, distinguished principally by the length of their tails and the margins of their breasts. The following are the most remarkable.

Common
lobster.

1. The gammarus, or common lobster, with a smooth thorax, short serrated snout; very long antennæ; and between them two shorter ones, bifid; claws and fangs large, the greater tuberculated, the lesser serrated on the inner edge; four pair of legs; six joints in the tail; tail-fins rounded. It inhabits all the rocky shores of our island, but chiefly where there is a depth of water. In Llyn in Caernarvonshire, a certain small lobster, nothing different except in size, burrows in the sand. They are brought in vast quantities from the Orkney isles, and many parts of the eastern coast of Scotland, to the London markets. Sixty or seventy thousand are annually brought from the neighbourhood of Montrose alone.—The lobster was well known to the ancients, and is well described by Aristotle under the name of *κραβη*. It is found as far as the Hellespont; and is called at Constantinople *liczuda* and *licpuda*.

Lobsters fear thunder, and are apt to cast their claws on a great clap: it is said that they will do the same on the firing of a great gun; and that, when men of war meet a lobster boat, a jocular threat is used, that, if the master does not sell them good lobsters, they will salute him.

The habitation of this species is in the clearest water, at the foot of rocks that impend over the sea. This has given opportunity of examining more closely into the natural history of the animal, than of many others who live in an element that prohibits most of the human researches, and limits the inquiries of the most inquisitive. Some lobsters are taken by hand; but the greater quantity in pots, a sort of trap formed of twigs, and baited with garbage; they are formed like a wire mouse-trap, so that when the lobster gets in, there is no return. These are fastened to a cord sunk in the sea, and their place marked by a buoy.—They begin to breed in the spring, and continue breeding most part of the summer. They propagate *more humano*, and are extremely prolific. Dr Bailler says he counted 12,444 eggs under the tail, besides those that remained in the body unprotruded. They deposit those eggs in the sand, where they are soon hatched.

Lobsters change their crust annually. Previous to their putting off their old one, they appear sick, languid, and restless. They totally acquire a new coat in a few days; but during the time that they remain defenceless, they seek some very lonely place, for fear of being devoured by such of their brethren as are not in the same situation. It is also remarkable, that lobsters and crabs will renew their claws, if by accident they are torn off; and it is certain they will grow again in a few weeks, though they never attain to the size of the first. They are very voracious animals, and feed on sea-weeds, garbage, and all sorts of dead bodies. The pincers of one of the lobsters large claws are furnished with knobs, and those of the other are always serrated. With the former it keeps firm hold of the stalks of submarine plants, and with the latter it cuts and minces its food very dextrously. The knobbed or *numb* claw, as the fishermen call it, is sometimes on the right and sometimes on the left side indifferently. It is more

dangerous to be seized by them with the cutting claw than the other; but, in either case, the quickest way to get disengaged from the creature is to pull off its claw. The female or *hen* lobster does not cast her shell the same year that she deposits her ova, or, in the common phrase, is in *berry*. When the ova first appear under her tail, they are small, and extremely black; but they become in succession almost as large as ripe elder-berries before they are deposited, and turn of a dark brown colour, especially towards the end of the time of her depositing them. They continue full, and depositing the ova in constant succession, as long as any of that black substance can be found in their body, which, when boiled, turns of a beautiful red colour, and is called their *coral*. Hen-lobsters are found in berry at all times of the year, but chiefly in winter. It is a common mistake, that a berried hen is always in perfection for the table. When her berries appear large and brownish, she will always be found exhausted, watery, and poor. Though the ova be cast at all times of the year, they seem only to come to life during the warm summer-months of July and August. Great numbers of them may then be found, under the appearance of tadpoles, swimming about the little pools left by the tides among the rocks, and many also under their proper form from half an inch to four inches in length. In casting their shells, it is hard to conceive how the lobster is able to draw the fish of their large claws out, leaving the shells entire and attached to the shell of their body, in which state they are constantly found. The fishermen say, the lobster pines before casting, till the fish of its large claw is no thicker than the quill of a goose, which enables it to draw its parts through the joints and narrow passage near the trunk. The new shell is quite membranaceous at first, but hardens by degrees. Lobsters only grow in size while their shells are in their soft state. They are chosen for the table, by their being heavy in proportion to their size; and by the hardness of their shells on their sides, which, when in perfection, will not yield to moderate pressure. Barnacles and other small fish adhering to them are reckoned certain signs of superior goodness. Cock-lobsters are in general better than the hens in winter; they are distinguished by the narrowness of their tails, and by their having a strong spine upon the centre of each of the transverse processes beneath the tail, which support the four middle plates of their tails. The fish of a lobster's claw is more tender, delicate, and easy of digestion, than that of the tail. In summer, the lobsters are found near the shore, and thence to about six fathoms water; in winter, they are seldom taken in less than 12 or 15 fathoms. Like other insects, they are much more active and alert in warm weather than in cold. In the water, they can run nimbly upon their legs or small claws; and, if alarmed, can spring, tail foremost, to a surprising distance, as swift as a bird can fly. The fishermen can see them pass about 30 feet; and, by the swiftness of their motion, suppose they may go much further. Athenæus remarks this circumstance, and says, that "the incurvated lobsters will spring with the activity of dolphins." Their eyes are raised upon moveable bases, which enables them to see readily every way. When frightened, they will spring from a considerable distance to their hold in the rock, and, what is not less surprising than true, will throw themselves into

Cancer, or
Crab, &c.

their

Cancer, or
Crab, &c.

Plate
LXVII.
fig. 4.

Cancer, or
Crab, &c.

Hermit-
crab,
Plate
LXXV.
fig. 1. n° 1, 2.

their hold in that manner through an entrance barely sufficient for their bodies to pass.

2. The *trigofus*, or plated lobster, with a pyramidal spiny snout; thorax elegantly plated, each plate marked near its junction with short striæ; claws much longer than the body, thick, echinated, and tuberculated; the upper fang trifid; only three legs spiny on their sides; tail broad.—The largest of this species is about six inches long. It inhabits the coasts of Anglesea, under stones and fuci. It is very active; and, if taken, flaps its tail against the body with much violence and noise.

Craw-fish,
prawn,
shrimp, &c.

3. The *atacus*, or craw-fish, with a projecting snout slightly serrated on the sides; a smooth thorax; back smooth, with two small spines on each side; claws large, beset with small tubercles; two first pair of legs clawed, the two next subulated, tail consisting of five joints; the caudal fins rounded.—It inhabits many of the rivers in England, lodged in holes which they form in the clayey banks. Cardan says, that this species indicates the goodness of water; for in the best water they are boiled into the reddest colour.

4. The *ferratus*, or prawn, with a long serrated snout bending upwards; three pair of very long filiform feelers; claws small, furnished with two fangs; smooth thorax; five joints to the tail; middle caudal fin subulated, two outmost flat and rounded.—It is frequent in several shores among loose stones; sometimes found at sea, and taken on the surface over 30 fathoms depth of water; cinereous when fresh, of a fine red when boiled.

5. The *crangon*, or shrimp, with long slender feelers, and between them two projecting laminae; claws with a fang, hooked, moveable fang; three pair of legs; seven joints in the tail; the middle caudal fin subulated, the four others rounded and fringed, a spine on the exterior side of each of the outmost.—It inhabits the shores of Britain in vast quantities, and is the most delicious of the genus.

6. The *squilla*, with a snout like a prawn, but deeper and thinner; the feelers longer in proportion to the bulk; the sub-caudal fins rather larger; is, at full growth, not above half the bulk of the former.—It inhabits the coasts of Kent; and is sold in London under the name of the *white shrimp*, as it assumes that colour when boiled.

7. The *atomos*, or atom-lobster, with a slender body; filiform antennæ; three pair of legs near the head; behind which are two pair of oval vesiculæ; beyond are three pair of legs, and a slender tail between the last pair.—It is very minute, and the help of the microscope is often necessary for its inspection.

8. The *pulex*, or flea-lobster, with five pair of legs, and two claws, imperfect; with 12 joints of the body. It is very common in fountains and rivulets; swims very swiftly in an incurvated posture on its back; embraces and protects its young between the legs; does not leap.

9. The *locusta*, or locust-lobster, with four antennæ; two pair of imperfect claws; the first joint ovated; body consists of 14 joints, in which it differs from the former.—It abounds, in summer, on the shores, beneath stones and algæ; leaps about with vast agility.

10. The *diogenes*, soldier-crab, or hermit-crab, with rough claws; the left claw is the longest (this being the only difference between the *diogenes* and *bernardus*);

the legs are subulated, and serrated along the upper ridge; the tail naked and tender, and furnished with a hook by which it secures itself in its lodging. This species is parasitic; and inhabits the empty cavities of turbinated shells, changing its habitation according to its increase of growth from the small *nerite* to the large *subelk*. Nature denies it the strong covering behind, which it has given to others of this class; and therefore directs it to take refuge in the deserted caves of other animals. They crawl very fast with the shell on their back; and at the approach of danger draw themselves within the shell, and, thrusting out the larger claw, will pinch very hard whatever molests them. Aristotle describes it very exactly under the name of *ναρσιον*. By the moderns it is called the *soldier*, from the idea of its dwelling in a tent; or the *hermit*, from retiring into a cell.

It is very diverting to observe this animal when wanting to change its shell. The little soldier is seen busily parading the shore along that line of pebbles and shells which is formed by the extremest wave; still, however, dragging its old inconvenient habitation at its tail, unwilling to part with one shell, even though a troublesome appendage, till it can find another more convenient. It is seen stopping at one shell, turning it, and passing it by; going on to another, contemplating that for a while, and then slipping its tail from its old habitation to try on the new: this also is found to be inconvenient, and it quickly returns to its old shell again. In this manner it frequently changes, till at last it finds one light, roomy, and commodious; to this it adheres, though the shell be sometimes so large as to hide the body of the animal, claws and all. Yet it is not till after many trials, and many combats also, that the soldier is thus completely equipped; for there is often a contest between two of them for some well-looking favourite shell for which they are rivals. They both endeavour to take possession; they strike with their claws, they bite each other, till the weakest is obliged to yield by giving up the object of dispute. It is then that the victor immediately takes possession, and parades it in his new conquest three or four times back and forward upon the strand before his envious antagonist.—When this animal is taken, it sends forth a feeble cry, endeavouring to seize the enemy with its nippers; which if it fastens upon, it will sooner die than quit the grasp.

The hermit-crabs frequent mostly those parts of the sea-shores which are covered with shrubs and trees, producing various wild fruits on which they subsist; though they will also feed on the fragments of fish and other animal substances cast on shore. When roasted in the shell, they are esteemed delicate. The hermit-crab, hung in the air, dissolves into a kind of oil, which speedily cures the rheumatism if rubbed upon the part.

11. The *vocans*, or sand-crab, is but of a small size; its colour light brown, or dusky white. It has eight legs, and two claws, one of which is double the size of the other: these claws serve both to defend and to feed themselves with. The head has two square holes, which are receptacles for its eyes; out of which it thrusts them, and draws them in again at pleasure. Their abode is only on the sandy shores of *Ilathera*, and many others of the Bahama islands. They run very fast, and retreat from danger into little holes they

make

Cancer, or
Crab.

The pea-
crab, &c.

Cancer, or
Crab.

12. The grapsus, or red mottled crab, hath a round body, the legs longer and larger than in other kinds; the claws red; except which, the whole is mottled in a beautiful manner with red and white. These crabs inhabit the rocks hanging over the sea; they are the nimblest of all others, and run with surprising agility along the upright side of a rock, and even under the rocks that hang horizontally below the water. This they are often necessitated to do for eluding the assaults of rapacious birds that pursue them. These crabs never go to land; but frequent mostly those parts of the promontories and islands of rocks in and near the sea, where, by the continual and violent agitation of the waves against the rocks, they are always wet, continually receiving the spray of the sea, which often washes them into it; but they instantly return to the rock again, not being able to live under water, and yet requiring more of that element than any of the crustaceous kinds that are not fish.

13. The granulatus, or rough-shelled crab: these crabs are pretty large, and are commonly taken from the bottom of the sea in shallow water; the legs are small in proportion to the body; the two claws are remarkably large and flat. The whole shell is covered over with innumerable little tubercles like shagreen: the colour is brown, variously stained with purple.

14. The cancer erythropus, or red-claw crab, is of a small size, and brown colour; it hath two claws of unequal bigness, red at the ends; and eight legs, which seem of less use to them than in other crabs; for when on the ground, they crawl with slow pace, dragging their bodies along; but they are mostly seen grasping with their claws, and hanging to some sea-plant, or other marine substance.

15. The pisum, or pea-crab, with rounded and smooth thorax, entire and blunt; with a tail of the size of the body, which commonly is the bulk of a pea. It inhabits the muscle, and has unjustly acquired the repute of being poisonous. The swelling after eating of muscles is wholly constitutional; for one that is affected by it, hundreds remain uninjured. Crabs either of this kind, or allied to them, the ancients believed to have been the consentaneous inmates of the PINNÆ, and other bivalves; which, being too stupid to perceive the approach of their prey, were warned of it by their vigilant friend. Oppian tells the fable prettily.

In clouded deeps below, the pinna hides,
And through the silent paths obscurely glides;
A stupid wretch, and void of thoughtful care,
He forms no halt, nor lays the tempting snare;
But the dull sluggish boasts a crab his friend,
Whose busy eyes the coming prey attend.
One room contains them, and the partners dwell
Beneath the convex of one sloping shell;
Deep in the watry vast the comrades rove,
And mutual interest binds their constant love;
That wifer friend the lucky juncture tells,
When in the circuit of his gaping shells
Fish wand'ring enter; then the bearded guide
Warns the dull mate, and pricks his tender side;
He knows the hint, nor at the treatment grieves,
But hugs th' advantage, and the pain forgives;
His closing shells the pinna sudden joins,
And 'twixt the pressing sides his prey confines:
Thus fed by mutual aid, the friendly pair
Divide their gains, and all the plunder share.

16. The mænas, or common crab, with three not-

ches on the front; five serrated teeth on each side; claws ovated; next joint toothed; hind feet fubulated; dirty green colour; red when boiled. It inhabits all our shores; and lurks under the algae, or burrows under the sand. Is sold, and eaten by the poor of our capitals.

17. The pagurus, or black-clawed crab, with a cre-nated thorax; smooth body; quinque-dentated front; smooth claws and black tips; hind-feet fubulated.—It inhabits the rocky coasts; is the most delicious meat of any; casts its shell between Christmas and Easter. The tips of the claws of this species are used in medicine; intended to absorb acidities in the stomach and bowels.

18. The velutinus, or velvet crab, with the thorax quinque-dentated; body covered with short, brown, velvet-like pile; claws covered with minute tubercles; small spines round the top of the second joint; hind legs broadly ovated.—This is among the species taken notice of by Aristotle on account of the broad feet, which, he says, assist them in swimming; as web-feet do the water-fowl. It inhabits the western coast of Anglesey.

19. The horridus, or horrid-crab, with a projecting Plate bifurcated snout, the end diverging; body heart-
shaped; with the claws and legs covered with long and
very sharp spines.—It is a large species, and inhabits
the rocks on the eastern coasts of Scotland. It is com-
mon to Norway and Scotland, as many of the marine
animals and birds are.

20. The rutilola, land-crab, or violet-crab, with
a smooth entire thorax, and the two last joints of the
feet armed with spines. It inhabits the Bahama islands,
as well as moist lands between the tropics; and feeds
upon vegetables.

These animals live not only in a kind of orderly society in their retreats in the mountains, but regularly once a-year march down to the sea-side in a body of some millions at a time. As they multiply in great numbers, they choose the month of April or May to begin their expedition; and then fallly out by thousands from the stumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themselves under the surface of the earth. At that time the whole ground is covered with this band of adventurers; there is no setting down one's foot without treading upon them. The sea is their place of destination, and to that they direct their march with right-lined precision. No geometrician could send them to their destined station by a shorter course; they neither turn to the right nor left, whatever obstacles intervene; and even if they meet with a house, they will attempt to scale the walls to keep the unbroken tenor of their way. But though this be the general order of their route, they, upon other occasions, are obliged to conform to the face of the country; and if it is intersected with rivers, they are then seen to wind along the course of the stream. The procession sets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which the first consists of the strongest and boldest males, that, like pioneers, march forward to clear the route and face the greatest dangers. These are often obliged to halt for want of rain, and to go into the moist conven-

Cancer, or
Crab.

Violet-crab.

Cancer, or
Crab.

Violet-crab.

nient encampment till the weather changes. The main body of the army is composed of females, which never leave the mountains till the rain is set in for some time, and then descend in regular battalia, being formed into columns of 50 paces broad, and three miles deep, and so close that they almost cover the ground. Three or four days after this, the rear-guard follows, a straggling undisciplined tribe, consisting of males and females, but neither so robust nor so vigorous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occasion; and they continue to move forward in their slow uniform manner. When the fun shines and is hot upon the surface of the ground, they then make an universal halt, and wait till the cool of the evening. When they are terrified, they march back in a confused disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the skin, and then leave the weapon where they insisted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten those that come to disturb them. But tho' they thus strive to be formidable to man, they are much more so to each other; for they are possessed of one most unfocial property, which is, that if any of them by accident is maimed in such a manner as to be incapable of proceeding, the rest fall upon and devour it on the spot, and then pursue their journey.

When, after a fatiguing march, and escaping a thousand dangers, (for they are sometimes three months in getting to the shore), they have arrived at their destined port, they prepare to cast their spawn. The peas are as yet within their bodies, and not excluded, as is usual in animals of this kind, under the tail; for the creature waits for the benefit of sea-water to help the delivery. For this purpose the crab has no sooner reached the shore, than it eagerly goes to the edge of the water, and lets the waves wash over its body two or three times. This seems only a preparation for bringing their spawn to maturity; for, without farther delay, they withdraw to seek a lodging upon land: in the mean time the spawn grows larger, is excluded out of the body, and sticks to the barbs under the flap, or more properly the tail. This bunch is seen as big as an hen's egg, and exactly resembling the roes of herrings. In this state of pregnancy they once more seek the shore for the last time; and shaking off their spawn into the water, leave accident to bring it to maturity. At this time whole shoals of hungry fish are at the shore in expectation of this annual supply; the sea to a great distance seems black with them; and about two thirds of the crabs eggs are immediately devoured by these rapacious invaders. The eggs that escape are hatched under the sand; and, soon after, millions at a time of these little crabs are seen quitting the shore, and slowly travelling up to the mountains. The old ones, however, are not so active to return; they have become so feeble and lean, that they can hardly creep along, and the flesh at that time changes its colour. The most of them, therefore, are obliged to continue in the flat parts of the country till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt, so that no air may enter. There they throw off their old shells, which they leave, as it were, quite whole; the place

where they opened on the belly being unseen. At that time they are quite naked, and almost without motion for six days together, when they become so fat as to be delicious food. They have then under their stomachs four large white stones, which gradually decrease in proportion as the shell hardens, and, when they come to perfection, are not to be found. It is at that time that the animal is seen slowly making its way back; and all this is most commonly performed in the space of six weeks.

This animal, when possessed of its retreats in the mountains, is impregnable: for, only subsisting upon vegetables, it seldom ventures out; and its habitation being in the most inaccessible places, it remains for a great part of the season in perfect security. It is only when impelled by the desire of bringing forth its young, and when compelled to descend into the flat country, that it is taken. At that time the natives wait for its descent in eager expectation, and destroy thousands; but, disregarding the bodies, they only seek for that small spawn which lies on each side of the stomach within the shell, of about the thickness of a man's thumb. They are much more valuable upon their return after they have cast their shell; for, being covered with a skin resembling soft parchment, almost every part except the stomach may be eaten. They are taken in the holes by feeling for them with an instrument; they are fought after by night, when on their journey, by flambeaux. The instant the animal perceives itself attacked, it throws itself on its back, and with its claws pinches most terribly whatever it happens to fasten on. But the dexterous crab-catcher takes them by the hinder legs in such a manner that the nippers cannot touch him, and thus he throws them into his bag. Sometimes also they are caught when they take refuge in the bottoms of holes in rocks by the sea-side, by clapping a stick at the mouth of the hole, which prevents their getting out; and then soon after, the tide coming, enters the hole, and the animal is found, upon its retiring, drowned in its retreat.

These crabs are of various sizes, the largest about six inches wide; they walk sideways like the sea-crab, and are shaped like them: some are black, some yellow, some red, and others variegated with red, white, and yellow mixed. Some of these are poisonous; and several people have died of eating of the crabs, particularly of the black kind. The light-coloured are reckoned best; and when full in flesh, are very well tasted. In some of the sugar-islands they are eat without danger; and are no small help to the negro slaves, who, on many of these islands, would fare very hard without them.

CANCER, in medicine, a roundish, unequal, hard, and livid tumour, generally seated in the glandulous parts of the body, supposed to be so called, because it appears at length with turgid veins shooting out from it, so as to resemble, as it is thought, the figure of a crab-fish; or, as others say, because, like that fish, where it has once got, it is scarce possible to drive it away. See (the *Index* subjoined to) MEDICINE.

CANCER, in astronomy, one of the twelve signs, represented on the globe in the form of a crab, and thus marked (♋) in books. It is the fourth constellation in the starry zodiac, and that from which one quadrant of the ecliptic takes its denomination. The reason generally

generally

Cancer
Candiac.

nerally assigned for its name as well as figure, is a supposed resemblance which the sun's motion in this sign bears to the crab-fish. As the latter walks backwards, so the former, in this part of his course, begins to go backwards, or recede from us; though the disposition of stars in this sign is by others supposed to have given the first hint to the representation of a crab.

Tropic of CANCER, in astronomy, a lesser circle of the sphere parallel to the equator, and passing through the beginning of the sign Cancer.

CANCHERIZANTE, or CANCHERIZATO, in the Italian music, a term signifying a piece of music that begins at the end, being the retrograde motion from the end of a song, &c. to the beginning.

CANDAHAR, a province of Persia, bounded on the north by the province of Balk; on the east, by that of Cabul; on the south, by Buchor and Sablestan; and on the west, by Sigistan. There have been bloody wars between the Indians and Persians on account of this province; but in 1650 it fell to the Persians. The inhabitants are known by the name of *Aghuans*, or *Afghans*, who have often endeavoured to throw off the yoke. But, in 1737, they were severely punished for such an attempt. See PERSIA.

CANDAHAR, the capital of the above province, is seated on a mountain; and being a place of great trade, has a considerable fortress. The caravans that travel from Persia and the parts about the Caspian sea to the East Indies, choose to pass through Candahar, because there is no danger of being robbed on this road, and provisions are very reasonable. The religion is Mahometanism, but there are many Banians and Guebres. E. Long. 67. 5. N. Lat. 33. o.

CANDAULES, the last king of Lydia, of the family of the Heraclides, was so proud of the beauty of his wife, that he had the folly to let Giges, his favourite, see her naked, while she was bathing. The queen, enraged at this action, which, according to the opinion of the Lydians, rendered her infamous, persuaded Giges to murder Candaules; after which he married him, about 716 years before the birth of Christ. In him began the race of the Merminades, which lasted till the defeat of Cæsus.

CANDELARES (from *candela* a candle), the name of an order in the former editions of Linnæus's Fragments of a natural method, consisting of these three genera, *rhizophora*, *nyssa*, and *minussops*. They are removed, in the latter editions, into the order *HOLORACEÆ*; which see.

CANDIA, the modern name of the island of Crete. See CRETE.

CANDIA, or *Mutium*, is the capital of the above island, situated on its northern coast, in E. Long. 25. o. N. Lat. 35. 30.

CANDIAC (John Lewis), a premature genius, born at Candiac in the diocese of Nîmes in France, in 1719. In the cradle he distinguished his letters: at 13 months, he knew them perfectly: at three years of age, he read Latin, either printed or in manuscript: at four, he translated from that tongue: at six, he read Greek and Hebrew; was master of the principles of arithmetic, history, geography, heraldry, and the science of medals; and had read the best authors on almost every branch of literature. He died of a complication of disorders, at Paris, in 1726.

CANDIDATE, a person who aspires to some public office.

In the Roman commonwealth, they were obliged to wear a white gown during the two years of their soliciting a place. This garment, according to Plutarch, they wore without any other clothes, that the people might not suspect they concealed money for purchasing votes, and also that they might more easily show to the people the scars of those wounds they had received in fighting for the defence of the commonwealth. The candidates usually declared their pretensions a year before the time of election, which was spent in making interest and gaining friends. Various arts of popularity were practised for this purpose, and frequent circuits made round the city, and visits and compliments to all sorts of persons, the process of which was called *ambitus*. See AMBITUS.

CANDIDATI MILITES, an order of soldiers, among the Romans, who served as the emperor's bodyguards to defend him in battle. They were the tallest and strongest of the whole troops, and most proper to inspire terror. They were called *candidati*, because clothed in white, either that they might be more conspicuous, or because they were considered in the way of preferment.

CANDISH, a considerable province of Asia, in the dominions of the Great Mogul, bounded by Chytor and Malva on the north, Oriza on the east, Decan on the south, and Guzarat on the west. It is populous and rich; and abounds in cotton, rice, and indigo. Brampor is the capital town.

CANDLE, a small taper of tallow, wax, or spermaceti; the wick of which is commonly of several threads of cotton, spun and twisted together.

A tallow-candle, to be good, must be half sheep's and half bullock's tallow; for hog's tallow makes the candle gutter, and always gives an offensive smell, with a thick black smoke. The wick ought to be pure, sufficiently dry, and properly twisted; otherwise the candle will emit an unconstant vibratory flame, which is both prejudicial to the eyes, and insufficient for the distinct illumination of objects.

There are two sorts of tallow-candles; the one dipped, the other moulded: the former are the common candles; the others are the invention of the sieur le Brege at Paris.

As to the method of making candles, in general; After the tallow has been weighed, and mixed in the due proportions, it is cut into very small pieces, that it may melt the sooner; for the tallow in lumps, as it comes from the butchers, would be in danger of burning or turning black, if it were left too long over the fire. Being perfectly melted and skimmed, they pour a certain quantity of water into it, proportionable to the quantity of tallow. This serves to precipitate, to the bottom of the vessel, the impurities of the tallow, which may have escaped the skimmer. No water, however, must be thrown into the tallow designed for the three first dips; because the wick, being still quite dry, would imbibe the water, which makes the candles crackle in burning, and renders them of bad use. The tallow, thus melted, is poured into a tub, through a coarse sieve of horse-hair, to purify it still more, and may be used after having stood three hours. It will continue fit for use 24 hours in summer, and 15 in winter.

Candidate
Candle.

Candle. winter. The wicks are made of spun cotton, which the tallow-chandlers buy in skains, and which they wind up into bottoms or clues. Whence they are cut out, with an instrument contrived on purpose, into pieces of the length of the candle required; then put on the sticks or broaches, or else placed in the moulds, as the candles are intended to be either dipped or moulded.

Wax-candles are made of a cotton or flaxen wick, slightly twisted, and covered with white or yellow wax. Of these, there are several kinds: some of a conical figure, used to illuminate churches, and in processions, funeral ceremonies, &c. (see TAPER); others of a cylindrical form, used on ordinary occasions. The first are either made with a ladle or the hand. 1. To make wax-candles with the ladle. The wicks being prepared, a dozen of them are tied by the neck, at equal distances, round an iron circle, suspended over a large basin of copper tinned, and full of melted wax: a large ladle full of this wax is poured gently on the tops of the wicks one after another, and this operation continued till the candle arrive at its destined bigness; with this precaution, that the three first ladles be poured on at the top of the wick, the fourth at the height of $\frac{1}{2}$, the fifth at $\frac{2}{3}$, and the sixth at $\frac{3}{4}$, in order to give the candle its pyramidal form. Then the candles are taken down, kept warm, and rolled and smoothed upon a walnut-tree table, with a long square instrument of box, smooth at the bottom. 2. As to the manner of making wax-candles by the hand, they begin to soften the wax, by working it several times in hot water, contained in a narrow but deep caldron. A piece of the wax is then taken out, and disposed by little and little, around the wick, which is hung on a hook in the wall, by the extremity opposite to the neck; so that they begin with the big end, diminishing till as they descend towards the neck. In other respects the method is nearly the same as in the former case. However, it must be observed, that, in the former case, water is always used to moisten the several instruments, to prevent the wax from sticking; and in the latter, oil of olives, or lard, for the hands, &c. The cylindrical wax-candles are either made, as the former, with a ladle, or drawn. Wax-candles drawn, are so called, because actually drawn in the manner of wire, by means of two large rollers of wood, turned by a handle, which, turning backwards and forwards several times, pass the wick through melted wax contained in a brass basin, and at the same time through the holes of an instrument like that used for drawing wire fastened at one side of the basin.

Makers of candles are not to use melting-houses, without due entry thereof at the excise-office, on pain of 100 l. and to give notice of making candles to the excise-officer for the duties, and of the number, &c. or shall forfeit 50 l. Removing the candles before weighed by the officer, or mixing them with others, is likewise liable to penalties.

Spermaceti CANDLES. See SPERMACETI.

Experiments to determine the real and comparative value of burning CANDLES of different sorts and sizes.

	Num.b of candle of one in one candle. pound.	Weight of one candle. Oz. Dr.	The time one can- dle lasted Hr. Min.	The time that one candle will last. Hr. Min.	The expence in 12 hours when candles are at 6 d, per dozen, which also shews the proportion of the expence at any price per dozen.	Farthings and 100th parts.
Small wick.	18 $\frac{1}{2}$	0 14	3 15	59 26	4.85	
Large wick.	19	0 13 $\frac{1}{2}$	2 40	50 34	5.70	
	16 $\frac{1}{2}$	0 15 $\frac{1}{2}$	2 40	44 2	6.54	
	12	1 5 $\frac{1}{2}$	3 27	41 24	6.96	
*	10 $\frac{1}{2}$	1 8	3 36	38 24	7.50	
*	7 $\frac{1}{2}$	2 1	4 9	32 12	8.94	
*	8	2 0	4 15	34 0	8.47	
	5 $\frac{1}{2}$	2 13	5 19	30 15	9.53	
Mould-candles.	5 $\frac{7}{8}$	2 12	7 20	42 39	7.87	Mould-candles at 7 s. per doz.
	4	4 0	9 3	36 20	9.28	

N. B. The time that one candle lasted was taken from an average of several trials in each size.

CANDLE is also a term in medicine, and is reckoned among the instruments of surgery. Thus the *candela fumalis*, or the *candela pro fuffitu odorata*, is a mass of an oblong form, consisting of odoriferous powders, mixed up with a third or more of the charcoal of willow or lime tree, and reduced to a proper consistence with a mucilage of gum tragacanth, labdanum, or turpentine. It is intended to excite a grateful smell without any flame, to correct the air, to fortify the brain, and to excite the spirits.

Medicated CANDLE, the same with BOUGIE.

CANDLE. Sale or auction by inch of candle, is when, a small piece of candle being lighted, the bystanders are allowed to bid for the merchandize that is selling; but the moment the candle is out, the commodity is adjudged to the last bidder.

There is also an excommunication by inch of candle; when the finner is allowed to come to repentance while a candle continues burning; but after it is consumed, he remains excommunicated to all intents and purposes.

Rush-CANDLES, used in different parts of England, are made of the pith of a sort of rushes, peeled or stripped from the skin, except on one side, and dipped in melted grease.

CANDLE-Wood, slips of pine about the thickness of a finger, used in New England and other colonies to burn instead of candles, giving a very good light. The French inhabitants of Tortuga use slips of yellow santal-wood for the same purpose and under the same denomination, which yields a clear flame, though of a green colour.

CANDLEBERRY TREE, in botany, the English name of the MYRICA.

CANDLEMAS, a feast of the church held on the second day of February, in honour of the purification of the Virgin Mary. It is borrowed from the practice of the ancient Christians, who on that day used abundance

Candle
|
Candlemas.

Candlestick,
Candy.

dance of lights both in their churches and processions, in memory, as is supposed, of our Saviour's being on that day declared by Simon "to be a light to lighten the Gentiles." In imitation of this custom, the Roman-catholics on this day consecrate all the tapers and candles which they use in their churches during the whole year. At Rome, the Pope performs that ceremony himself; and distributes wax-candles to the cardinals and others, who carry them in procession through the great hall of the Pope's palace. This ceremony was prohibited in England by an order of council in 1548.

CANDLESTICK, an instrument to hold a candle, made in different forms, and of all sorts of matter.

The golden candlestick was one of the sacred utensils made by Moses to be placed in the Jewish tabernacle. It was made of hammered gold, a talent in weight. It consisted of seven branches supported by a base or foot. These branches were adorned at equal distances with six flowers like lilies, and with as many bowls and knobs placed alternately. Upon the stock and six branches of the candlestick were the golden lamps, which were immoveable, wherein were put oil and cotton.

These seven lamps were lighted every evening, and extinguished every morning. The lamps had their tongs or snuffers to draw the cotton in or out, and dishes underneath them to receive the sparks or droppings of the oil. This candlestick was placed in the antichamber of the sanctuary on the south side, and served to illuminate the altar of perfume and the tabernacle of the shew-bread. When Solomon had built the temple of the Lord, he placed in it ten golden candlesticks of the same form as that described by Moses, five on the north and five on the south side of the holy. But, after the Babylonish captivity, the golden candlestick was again placed in the temple, as it had been before in the tabernacle by Moses. This sacred utensil, upon the destruction of the temple by the Romans, was lodged in the temple of peace built by Vespasian; and the representation of it is still to be seen on the triumphal arch at the foot of mount Palatine, on which Vespasian's triumph is delineated.

CANDY, a large kingdom of Asia, in the island of Ceylon. It contains about a quarter of the island; and as it is encompassed with high mountains, and covered with thick forests, through which the roads and paths are narrow and difficult, the king has them guarded, to prevent his subjects from going into other countries. It is full of hills, from whence rivulets proceed which are full of fish; but as they run among the rocks, they are not fit for boats; however, the inhabitants are very dextrous in turning them to water their land, which is fruitful in rice, pulse, and hemp. The king is absolute, and his subjects are idolaters. The capital town is of the same name.

CANDY, a town of Asia, and capital of a kingdom of the same name, in the island of Ceylon. It has been often burnt by the Portuguese, when they were masters of these coasts. The houses are very poor, low, and badly furnished. E. Long. 79. 12. N. Lat. 7. 35.

CANDY, or *Sugar-Candy*, a preparation of sugar made by melting and crystallizing it six or seven times over, to render it hard or transparent. It is of three kinds, white, yellow, and red. The white comes from the loaf-sugar, the yellow from the cassonado, and the

red from the muscavado.

CANDYING, the act of preserving simples in substance, by boiling them in sugar. The performance of this originally belonged to the apothecaries, but is now become a part of the business of the confectioner.

CANE, in botany. See **ARUNDO**.

CANE, denotes also a walking stick. It is customary to adorn it with a head of gold, silver, agate, &c. Some are without knots, and very smooth and even; others are full of knots, about two inches distance from one another. These last have very little elasticity, and will not bend so well as the others.

Canes of Bengal are the most beautiful which the Europeans bring into Europe. Some of them are so fine, that people work them into bowls or vessels, which being varnished over in the inside, with black or yellow lacca, will hold liquors as well as glass or China ware does; and the Indians use them for that purpose.

CANE is also the name of a long measure, which differs according to the several countries where it is used.

At Naples the cane is equal to 7 feet $3\frac{1}{2}$ inches English measure: the cane of Tholouse and the Upper Languedoc, is equal to the varre of Arragon, and contains five feet $8\frac{1}{2}$ inches; at Montpellier, Provence, Dauphine, and the Lower Languedoc, to six English feet $5\frac{1}{2}$ inches.

CANEA, a strong and considerable town of the island of Candia, where a bashaw resides. It is inhabited by 1500 Turks, 2000 Greeks, some Jews, and a few French merchants, with their consul. The harbour is pretty good; but the fortifications are much out of repair. The environs of the town are admirable; being adorned with forests of olive-trees mixed with fields, vineyards, gardens, and brooks bordered with myrtle-trees and laurel-roses. The chief revenue of this town consists in oil-olive. E. Long. 24. 15. N. Lat. 35. 28.

CANELLA ALBA, a kind of bark rolled up in long quills, thicker than cinnamon, and both outwardly and inwardly of a whitish colour, lightly inclining to yellow. It is the produce of a tall tree growing in great plenty in the lowlands in Jamaica and other American islands. The canella is the interior bark freed from an outward thin rough one, and dyed in the shade. The shops distinguish two sorts of canella, differing from one another in the length and thickness of the quills: they are both the bark of the same tree, the thicker being taken from the trunk, and the thinner from the branches. This bark is a warm pungent aromatic, not of the most agreeable kind, nor are any of the preparations of it very grateful.*

CANELLE, or **CANE-LAND**, a large country in the island of Ceylon, called formerly the *kingdom of Cota*. It contains a great number of cantons, the principal of which are occupied by the Dutch. The chief riches of this country consists in cinnamon, of which there are large forests. There are five towns on the coast, some forts, and a great number of harbours. The rest of the country is inhabited by the natives; and there are several rich mines, from whence they get rubies, sapphires, topazes, cats-eyes, and several other precious stones.

CANEPHORÆ, in Grecian antiquity, virgins who, when they became marriageable, presented certain baskets.

Candyng
||
Canelle.* See *Materia Medica*, no 101.

Canephoria kets full of little curiosities to Dians, in order to get leave to depart out of her train, and change their state of life.

CANEPHORIA, in Grecian antiquity, a ceremony which made part of a feast, celebrated by the Athenian virgins, on the eve of their marriage-day.—At Athens the canephoria consisted in this; that the maid, conducted by her father and mother, went to the temple of Minerva, carrying with her a basket full of presents, to engage the goddess to make the marriage-state happy; or, as the scholiast of Theocritus has it, the basket was intended as a kind of honourable amends made to that goddess, the protectrix of virginity, for abandoning her party; or as a ceremony to appease her wrath. Suidas calls it a festival in honour of Diana.

CANEPHORIA, is also the name of a festival in honour of Bacchus, celebrated particularly by the Athenians, on which the young maids carried golden baskets full of fruit, which baskets were covered, to conceal the mystery from the uninitiated.

CANES, in Egypt and other eastern countries, a poor sort of buildings for the reception of strangers and travellers. People are accommodated in these with a room at a small price, but with no other necessities; so that, excepting the room, there are no greater accommodations in these houses than in the deserts, only that there is a market near.

CANETO, a strong town of Italy in the duchy of Mantua, seated on the river Oglio, which was taken by the Imperialists in 1701, by the French in 1702, afterwards by the Imperialists, and then by the French in 1705. E. Long. 10. 45. N. Lat. 40. 55.

CANGA, in the Chinese affairs, a wooden clog borne on the neck, by way of punishment for divers offences. The canga is composed of two pieces of wood notched, to receive the criminal's neck; the load lies on his shoulders, and is more or less heavy according to the quality of his offence. Some cangas weigh 200 lb; the generality from 50 to 60. The Mandarin condemn to the punishment of the canga. Sentence of death is sometimes changed for this kind of punishment.

CANGE (Charles du Fresnoy sieur du), one of the most learned writers of his time, was born at Amiens in 1610, and studied at the Jesuits college in that city. Afterwards he applied himself to the study of the law at Orleans, and gained great reputation by his works, among which are, 1. The history of the empire of Constantinople under the French emperors. 2. John Cinnamus's six books of the history of the affairs of John and Manuel Comnenus, in Greek and Latin, with historical and philological notes. 3. *Glossarium ad Scriptores medie & infime Latinitatis*.

CANICULA, is a name proper to one of the stars of the constellation *canis major*, called also simply the *dog-star*; by the Greeks *Sirius* *. Canicula is the tenth in order in the Britanic catalogue; in Tycho's and Ptolemy's it is the second. It is situated in the mouth of the constellation; and is of the first magnitude, being the largest and brightest of all the stars in the heavens. From the rising of this star not cosmically, or with the sun, but heliacally, that is, its emergence from the sun's rays, which now happens about the 15th day of August, the ancients reckoned their *dies caniculares*, or dog-days. The Egyptians and Ethiopians began their year at the rising of the canicula, reckoning to its rise

again the next year, which is called the *annus canarius*, or canicular year. This year consisted ordinarily of 365 days, and every fourth year of 366, by which it was accommodated to the civil year. The reason of their choice of the canicula before the other stars to compute their time by, was not only the superior brightness of that star, but because its heliacal rising was in Egypt a time of singular note, as falling on the greatest augmentation of the Nile, the reputed father of Egypt. Ephellion adds, that from the aspect and colour of canicula, the Egyptians drew prognostics concerning the rise of the Nile; and, according to Florus, predicted the future state of the year; so that the first rising of this star was annually observed with great attention.

CANICULUM, or **CANICULUS**, in the Byzantine antiquities, a golden standish or ink-vessel, decorated with precious stones, wherein was kept the sacred *encaustum*, or red ink, wherewith the emperors signed their decrees, letters, &c. The word is by some derived from *canis*, or *caniculus*; alluding to the figure of a dog which it represented, or rather because it was supported by the figures of dogs. The caniculum was under the care of a particular officer of state.

CANINA, the north part of the ancient Epirus, a province of Greece, which now belongs to the Turks, and lies off the entrance of the gulph of Venice. The principal town is of the same name, and is seated on the sea-coast, at the foot of the mountains of Chimera. E. Long. 19. 25. N. Lat. 40. 55.

CANINANA, in zoology, the name of a species of serpent found in America, and esteemed one of the less poisonous kinds. It grows to about two feet long; and is green on the back, and yellow on the belly. It feeds on eggs, and small birds; the natives cut off the head and tail, and eat the body as a delicate dish.

CANINE, whatever partakes of, or has any relation to, the nature of a dog.

CANINE Appetite, amounts to much the same with **BULIMY**.

CANINE Madness. See (the *Index* subjoined to) **MEDICINE**.

CANINE Teeth, are two sharp-edged teeth in each jaw; one on each side, placed between the incisores and molares.

CANINI (John Angelo and Marc Anthony), brothers and Romans, celebrated for their love of antiquities. John excelled in designs for engraving on stones, particularly heads; Marc engraved them. They were encouraged by Colbert to publish a succession of heads of the heroes and great men of antiquity, designed from medals, antique stones, and other ancient remains; but John died at Rome soon after the work was begun: Marc Anthony, however, procured assistance, finished and published it in Italian in 1669. The cuts of this edition were engraved by Canini, Picard, and Valet; and a curious explanation is given, which discovers the skill of the Canini's in history and mythology. The French edition of Amsterdam, 1731, is spurious.

CANIS, or **Dog**, in zoology, a genus of quadrupeds, belonging to the order of *feræ*. The characters of the dog are these: he has six fore-teeth in the upper jaw, those in the sides being longer than the intermediate ones, which are lobated; in the under jaw there are likewise six fore-teeth, those on the sides being lobated.

* See *Sirius*.

Canephoria
||
Canicula.

Caniculum
||
Canini.

Canis.

The Dog.

bated. He has six grinders in the upper, and seven in the lower jaw. The teeth called *dog-teeth* are four, one on each side, both in the lower and upper jaw; they are sharp-pointed, bent a little inward, and stand at a distance from any of the rest.

There are eight species of this genus, *viz.*

I. The *FAMILIARIS*, or domestic dog, is distinguished from the other species, by having his tail bent to the left side; which mark is so singular, that perhaps the tail of no other quadruped is bent in this manner. Of this species there are a great number of varieties. Linnæus enumerates 11, and Buffon gives figures of no less than 27.—The mastiff is about the size of a wolf, with the sides of the lips hanging down, and a full robust body. The large Danish dog differs only from the former in being fuller in the body, and generally of a larger size. The gre-hound is likewise the same with the mastiff; but its make is more slender and delicate. Indeed the difference betwixt these three dogs, although perfectly distinguishable at first sight, is not greater than that betwixt a Dutchman, a Frenchman, and an Italian. The shepherd's dog, the wolf-dog, and what is commonly called the *Siberian dog*, to which may be joined the Lapland dog, the Canada dog, and, in general, all those which have strait ears and a pointed snout, are all one kind, differing only in thickness, the roughness or smoothness of their skin, the length of their legs, and tails. The hound or beagle, the terrier, the braque or harrier, and the spaniel, may be considered as the same kind: they have the same form and the same instincts; and differ only in the length of their legs, and size of their ears, which in each of them are long, soft, and pendulous. The bull-dog, the small Danish dog, the Turkish dog, and the Iceland dog, may likewise be considered as the same kind, all the varieties in their appearance taking their rise merely from climate. For instance, the Turkish dog, which has no hair, is nothing else but the small Danish dog transported to a warm climate, which makes the hair fall off. A dog of any kind loses its hair in very warm climates. But this is not the only change which arises from difference of climate. In some countries, the voice is changed; in others, dogs become altogether silent. In some climates they lose the faculty of barking, and howl like wolves, or yelp like foxes. Warm climates even change their form and instincts: they turn ill-shaped, and their ears become strait and pointed. It is only in temperate climates that dogs preserve their natural courage, ardour, and sagacity.

In order to give an idea of the different kinds of dogs in different climates, and of the varieties produced by mixtures, we shall give an explanation of Buffon's genealogical tree, see Plate LXX. fig. 1. This tree is constructed in the form of a geographical chart, in which the situation of the different climates to which the particular dogs belong, is observed as accurately as the nature of the thing will admit.

The shepherd's dog is the stump of the tree; this dog, when transported to Lapland, or any very cold climate, assumes an ugly appearance, and its legs become short. But, in Britain, Russia, Siberia, &c. where the cold is not so rigorous, and the people are more civilized, he arrives at greater perfection, both in form and sagacity. The same shepherd's dog, when brought up in a country fully civilized, as Britain or France,

loses his savage air, his strait ears, his thick long hair, and becomes what is called a *bull-dog*, a *mastiff*, a *beagle*, or hound. These changes, Buffon attributes to the influence of the climate, the manners of the people, &c. The mastiff and the bull-dog have their ears still partly strait, or half-pendent, and resemble in their manners and sanguine disposition the dog from which they derive their origin. The beagle or hound preserves less of the appearance of its origin than the other two; its ears are long and entirely pendent; the softness, the tractability, the timidity of this dog, Buffon considers as so many proofs of its great degeneracy, or rather of that perfection which it acquires by culture and living among a civilized people.

The hound, the small spotted setting-dog, and the terrier, are all of the same family; for all the three kinds are often produced at the same litter, although the female hound had been covered only by one of these kinds.

When the hound is transported to Spain, or Barbary, where almost every animal has fine, long, downy hair, it is changed into a water-hound, or spaniel. And the small and large spaniel, which differ only in the tail, when carried to Britain, are changed from a white to a black colour, and become what are called the *large* and *small shagged dogs*.

The mastiff, when carried to the north, is changed into the large Danish dog; and when transported to the south, it becomes a gre-hound. The large gre-hounds come from the Levant; those of a lesser size come from Italy; and the Italian gre-hounds, when brought to Britain, become what the French call *levrons*, that is, gre-hounds of the least size.

The great Danish dog, when carried to Ireland, the Ukraine, Tartary, &c. is changed into the Irish dog, which is the largest of all dogs.

The bull-dog, when carried from Britain to Denmark, becomes the small Danish dog; and this small Danish dog, when transported into a warm climate, loses its hair, and is changed into the Turkish dog.

All these races or families, with their varieties, are produced by the influence of climate, food, and education: the other kinds marked in the tree are not pure or distinct families, but are produced by the commixture of the other families. These mongrel dogs, with the particular parents which produce them, are marked out in the tree by dotted lines. For example,

The gre-hound and mastiff produce the mongrel gre-hound, which is likewise called the *gre-hound with wolf's hair*. The large Danish dog and the large spaniel produce the Calabrian dog; which is a beautiful dog, with long bushy hair, and of a larger size than the mastiff. The spaniel and the small Danish dog produce the lion-dog, which is a very rare kind. It is needless to give more examples, as they can easily be traced from the dotted lines in the tree.

Dr Caius has left, among several other tracts relating to natural history, one written expressly on the species of *British dogs*: besides a brief account of the variety of dogs then existing in this country, he has added a systematic table of them: his method is so judicious, that we shall make use of the same; explain it by a brief account of each kind; and point out those that are no longer in use amongst us.

Canis.

The Dog.

The Dog.

SYNOPSIS OF BRITISH DOGS.

The Dog.

I. The most generous kinds.	Dogs of chase.	Hounds.	Terrier
			Harrier
			Blood-hound
II. Farm Dogs.	Dogs of fowling.	Fowling.	Gaze-hound
			Gre-hound
			Leviner, or Lyemmer
III. Mon- grels.	Lap Dogs.	Spaniel.	Tumbler
			Spaniel
			Setter
	Dogs of chase.	Dogs of chase.	Water-spaniel, or finder
			Spaniel gentle, or comforter
			Shepherd's dog
	Dogs of fowling.	Fowling.	Maliff, or ban dog.
			Wappe
			Turnspit
	Dogs of chase.	Dogs of chase.	Dancer.

a. The first variety is the *terrarius*, or terrier, which takes its name from its subterraneous employ; being a small kind of hound used to force the fox, or other beasts of prey, out of their holes; and, in former times, rabbits out of their burrows into nets.

b. The *leverarius*, or harrier, is a species well known at present: it derives its name from its use, that of hunting the hare; but under this head may be placed the fox-hound, which is only a stronger and swifter variety, applied to a different chase.

c. The *fanguinarius*, blood-hound, or *sleut-hounde* of the Scots, was a dog of great use, as already noticed under the article *Blood-Hound*.

The next division of this species of dogs comprehends those that hunt by the eye; and whose success depends either upon the quickness of their sight, their swiftness, or their subtlety.

d. The *agaseus*, or gaze-hound, was the first: it chased indifferently the fox, hare, or buck. It would select from the herd the fattest and fairest deer; pursue it by the eye; and, if lost for a time, recover it again by its singular distinguishing faculty; nay, should the beast rejoin the herd, this dog would fix unerringly on the same. This species is now lost, or at least unknown to us.

e. The next kind is the *leporarius*, or gre-hound. Dr Caius informs us, that it takes its name *quod precipui gradus sit inter canes*, "the first in rank among dogs:" that it was formerly esteemed so, appears from the forest-laws of king Canute, who enacted that no one under the degree of a gentleman should presume to keep a gre-hound; and still more strongly from an old Welsh saying which signifies, that "you may know a gentleman by his hawk, his horse, and his gre-hound."

The variety called the *Highland gre-hound*, and now become very scarce, is of very great size, strong, deep-chested, and covered with long rough hair. This kind was much esteemed in former days, and used in great numbers by the powerful chieftains in their magnificent

hunting-matches. It had as sagacious nostrils as the blood-hound, and was as fierce.

f. The third species is the *levinarius*, or *lorarius*; the *leviner* or *lyemmer*: the first name is derived from the lightness of the kind; the other from the old word *lyemie*, a thong; this species being used to be led in a thong, and dipped at the game. Our author says that this dog was a kind that hunted both by scent and sight; and in the form of its body observed a medium between the hound and the gre-hound. This probably is the kind now known among us by the name of the *Irish gre-hound*, a dog now extremely scarce in that kingdom, the late king of Poland having procured from them as many as possible. They were of the kind called by Buffon *le grand Danois*, and probably imported there by the Danes who long possessed that kingdom. Their use seems originally to have been for the chase of wolves with which Ireland swarmed till the latter end of the last century. As soon as these animals were extirpated, the numbers of the dogs decreased; for, from that period, they were kept only for state.

g. The *vertagus*, or tumbler, is a fourth species; which took its prey by mere subtlety, depending neither on the sagacity of its nose, nor its swiftness: if it came into a warren, it neither barked, nor ran on the rabbits; but by a seeming neglect of them, or attention to something else, deceived the object till it got within reach, so as to take it by a sudden spring. This dog was less than the hound, more scrappy, had prick ears, and by Dr Caius's description seems to answer to the modern lurcher.

The third division of the more generous dogs comprehends those which were used in fowling.

h. First, the *Hispanielus*, or spaniel: from the name, it may be supposed that we were indebted to Spain for this breed. There were two varieties of this kind: the first used to spring the game, which are the same with our starters. The other variety was used only for the net, and was called *index*, or the setter; a kind well known at present. This kingdom has been long remarkable for producing dogs of this sort, particular care having been taken to preserve the breed in the utmost purity. They are still distinguished by the name of *English spaniel*; so that, notwithstanding the derivation of the name, it is probable they are natives of Great Britain.

i. The *aquaticus*, or fynder, was another species used in fowling; was the same with our water-spaniel; and was used to find or recover the game that was shot.

k. The *Meliteus*, or *sitor*, the spaniel gentle or comforter of Dr Caius (the modern lap-dog), was the last of this division. The Maltese little dogs were as much esteemed by the fine ladies of past times, as those of Bologna are among the modern. Old Hollingshed is ridiculously severe on the fair of his days, for their excessive passion for these little animals; which is sufficient to prove that it was, in his time*, a novelty.

2. The second grand division of dogs comprehends the *rustici*, or those that were used in the country.

a. The first species is the *pastorali*, or shepherd's dog; which is the same that is used at present, either in guarding our flocks, or in driving herds of cattle. This kind is so well-trained for these purposes, as to attend to every part of the herd be it ever so large; confine them to the road; and force in every straggler, without doing it the least injury.

b. The

* The reign of queen Elizabeth.

b. The next is the *villaticus*, or *catenarius*; the mastiff or band dog; a species of great size and strength, and a very loud barker. Caius tells us that three of these were reckoned a match for a bear; and four for a lion: but from an experiment made in the Tower of London, that noble quadruped was found an unequal match to only three. Two of the dogs were disabled in the combat, but the third forced the lion to seek for safety by flight. The English bull-dog seems to belong to this species; and probably is the dog our author mentions under the title of *lanarius*. Great Britain was so noted for its mastiffs, that the Roman emperors appointed an officer in this island under the name of *procurator cynegii*, whose sole business was to breed, and transmit from hence to the amphitheatre, such as would prove equal to the combats of the place. Grattius speaks in high terms of the excellency of the British dog.

Cynegestus,
lin. 175.

*Atque ipse libet penetrare Britannos?
O quanta est merces, et quantum impendia supra!
Si non ad speciem, mentisque de oris
Protinus: hec una est castis iussura Britannis.
At magnum cum venit opus, promendaque virtus,
Et vocat extremo preceps discrimine Mavors,
Non tunc egregios tantum admirare Molossos.
If Britain's distant coast we dare explore,
How much beyond the coast the valued store;
If shape and beauty not alone we prize,
Which nature to the British hound denies;
But when the mighty toil the husman wars,
And all the soul is rous'd by fierce alarms,
When Mars calls furious to th' ensanguin'd field,
Even bold Molossians then to these must yield.*

Strabo tells us that the mastiffs of Britain were trained to war, and were used by the Gauls in their battles; and it is certain, a well trained mastiff might be of use in distressing such half-armed and irregular combatants, as the adversaries of the Gauls seem generally to have been before the Romans conquered them.

3. The last division is that of the *degeneres*, or curs.

a. The first of these was the *vaappe*, a name derived from its note; its only use was to alarm the family by barking, if any person approached the house.

b. Of this class was the *versator*, or turn-spit; and lastly the *saltator*, or dancing-dog; or such as was taught variety of tricks, and carried about by idle people as a show. These *degeneres* were of no certain shape, being mongrels or mixtures of all kinds of dogs.

HAVING thus traced the varieties of the dog, and noticed the peculiarities of each, we shall now give its general natural history.

From the structure of the teeth, it might be concluded *a priori* that the dog is a carnivorous animal. He does not, however, eat indiscriminately every kind of animal substance. There are some birds, as the colymbus arcticus, which the water-dog will lay hold of with his kennels, but will not bring out of the water, because its smell is exceedingly offensive to him. He will not eat the bones of a goose, crow, or hawk: but he devours even the putrid flesh of most other animals. He is possessed of such strong digestive powers, as to draw nourishment from the hardest bones. When flesh cannot be procured, he will eat fish, fruits, succulent herbs, and bread of all kinds. When oppressed with sickness, to which he is very subject, especially in the beginning of summer, and before ill weather, in order to procure a puke, he eats the leaves of the quicken-grafs,

the bearded wheat-grafs, or the rough cock's-foot grafs, which gives him immediate relief. When he steals a piece of flesh, as conscious of the immorality of the action, he runs off with his tail hanging and bent in between his feet.

His drink is water, which he takes in small quantities at a time, by licking with his tongue. He is in some measure obliged to lick in this manner, otherwise his nose would be immerged in the water.

His excrements are generally hard scybals, which, especially after eating bones, are white, and go by the name of *album græcum* among physicians. This album græcum was for a long time in great repute as a septic; but it is now entirely disregarded. He does not throw out his excrements promiscuously upon every thing that happens to be in the way, but upon stones, trunks of trees, or barren places. This is a wise institution of nature; for the excrements of a dog destroy almost every vegetable or animal substance. They are of such a putrid nature, that if a man's shoe touches them when recently expelled, that particular part will rot in a few days. He observes the same method in making his urine, which he throws out at a side. It is remarkable, that a dog will not pass a stone or a wall against which any other dog has pissed, without following his example, although a hundred should occur in a few minutes, in so much that it is astonishing how such a quantity can be secreted in so short a time.

The dog is an animal not only of quick motion, but remarkable for travelling very long journeys. He can easily keep up with his master, either on foot or horseback, for a whole day. When fatigued, he does not sweat, but lolls out his tongue. Every kind of dog can swim; but the water-dog excels in that article.

The dog runs round when about to lie down, in order to discover the most proper situation. He lies generally on his breast, with his head turned to one side, and sometimes with his head above his two fore-feet. He sleeps little, and even that does not seem to be very quiet; for he often starts, and seems to hear with more acuteness in sleep than when awake. They have a tremulous motion in sleep, frequently move their legs, and bark, which is an indication of dreaming.

Dogs are possessed of the sensation of smelling in a high degree. They can trace their master by the smell of his feet in a church, or in the streets of a populous city. This sensation is not equally strong in every kind. The hound can trace game, or his master's steps, 24 hours afterwards. He barks more furiously the nearer he approaches the fowls, unless he be beat and trained to silence.

The dog eats enviously, with oblique eyes: is an enemy to beggars: bites at a stone flung at it: is fond of licking wounds: howls at certain notes in music, and often urinates on hearing them.

With regard to the propagation of dogs; the females admit the males before they are 12 months old. They remain in season 10, 12, or even 15 days, during which time they will admit a variety of males. They come in season generally twice in the year, and more frequently in the cold than in the hot months. The male discovers the condition of the female by the smell; but she seldom admits him the first six or seven days. One coitus will make her conceive a great number of young; but, when not restrained, she will admit several dogs

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The Dog.

every day: she seems to have no choice or predilection, except in favour of large dogs: from this circumstance, it sometimes happens, that a small female, who has admitted a mastiff, perishes in bringing forth her young. During the time of copulation, these animals cannot separate themselves, but remain united so long as the erection subsists. This is owing to the structure of the parts. The dog has not only a bone in his penis, but in the middle of the corpus cavernosum there is a large hollow, which is blown up in the time of erection to a considerable bulk. The female, on the other hand, has a larger clitoris than perhaps any other animal; besides, a large firm protuberance rises in the time of copulation, and remains perhaps longer than that of the male, and prevents him from retiring till it subsides: accordingly, after the act of copulation is over, the male turns about in order to rest himself on his legs, and remains in that position till the parts turn flaccid. The female goes with young about nine weeks. They generally bring forth from six to twelve puppies. Those of a small size bring forth five, four, and sometimes but two. They continue to copulate and bring forth during life, which lasts generally about 14 or 15 years. The whelps are commonly blind, and cannot open their eyes, till the 10th or 12th day: the males are like the dog, the females like the bitch. In the fourth month, they lose some of their teeth, which are soon succeeded by others.

The dog has such a strong resemblance to the wolf and the fox, that he is commonly supposed to be the production of one or other of these animals tamed and civilized. Buffon informs us, that he kept a young dog and a young wolf together till they were three years of age, without their discovering the least inclination to copulate. He made the same experiment upon a dog and a fox; but their antipathy was rather increased when the female was in season. From these experiments he concludes, that dogs, wolves, and foxes, are perfectly distinct species of animals. There has, however, been lately an instance to the contrary. Mr Brooke, animal-merchant in Holborn, turned a wolf to a Pomeranian bitch in heat; the congress was immediate, and as usual between dog and bitch: she produced ten puppies. Mr Pennant says he saw one of them that had very much the resemblance of a wolf, and also much of its nature; being slipped at a weak deer, it instantly caught at the animal's throat and killed it.

With regard to the natural disposition of the dog: in a savage state, he is fierce, cruel, and voracious; but, when civilized and accustomed to live with men, he is possessed of every amiable quality. He seems to have no other desire than to please and protect his master. He is gentle, obedient, submissive, and faithful. These dispositions, joined to his almost unbounded sagacity, justly claim the esteem of mankind. Accordingly no animal is so much caressed or respected: he is so docile, and so much formed to please, that he assumes the very air and temper of the family in which he resides.

An animal endowed with such uncommon qualities must answer many useful purposes. His fidelity and vigilance are daily employed to protect our persons, our flocks, or our goods. The acuteness of his smell gains him employment in hunting: he is frequently employed as a turnspit: at Brussels and in Holland, he is train-

ed to draw little carts to the herb-market; and in Siberia, draws a sledge with his master in it, or loaden with provisions.

The dog is liable to many diseases, as the scab, mad-nels, &c. and he seldom wants the tenia or tape-worm in his guts, especially if he drinks dirty water. [See Plate LXX. and LXXI.]

II. The second species of this kind is the LUPUS, or wolf, which is distinguished from the dog by having its tail turned inward. The wolf is larger and fiercer than a dog. His eyes sparkle, and there is a great degree of fury and wildness in his looks. He draws up his claws when he walks, to prevent his tread from being heard. His neck is short, but admits of very quick motion to either side. His colour is generally blackish. Like most ferocious animals, he can bear hunger a very long time; but, at last, when the appetite for victuals becomes intolerable, he grows perfectly furious, and will attack men, horses, dogs, and cattle of all kinds; even the graves of the dead are not proof against his rapacity. This circumstance is finely described, in the following lines.

By wintry famine rous'd,
Cruel as death, and hungry as the grave!
Burning for blood! bony, and ghast, and grim!
Assembling wolves in raging troops descend;
And, pouring o'er the country, bear along,
Keen as the north-wind sweeps the glossy snow.
All is their prize. They fasten on the dead,
Press him to earth, and pierce his mighty heart,
Nor can the bull his awful front defend,
Or shake the murdering savages away.
Ravenous at the mother's throat they fly,
And tear the screaming infant from her breast.
The god-like face of Man avails him nought.
Even beauty, force divine! at whose bright glance
The generous lion stands in soften'd gaze,
Here bleeds, a hapless undistinguish'd prey.
But if, appris'd of the severe attack,
The country be shut up, lur'd by the scent,
On church-yards drear (inhuman to relate!)
The disappointed prowlers fall, and dig
The shrouded body from the grave; o'er which,
Mix'd with foul shades, and frighted ghosts, they howl.

THOMSON'S WINTER.

The wolf is extremely suspicious, and, unless pressed with hunger, seldom ventures out of the woods. They make a howling noise in the night, and assemble together in troops in order to devour their prey. The females are in heat in winter; and followed by several males, which occasions great combats. She goes with young ten weeks; near her time, prepares a soft bed of moss, in some retired place; and brings forth from five to nine at a birth.—The wolf is a native of Europe, and frequents the woods of many parts of the continent to this day. The teeth of this animal are large and sharp; and its bite is terrible, as its strength is great. The hunters therefore clothe their dogs, and guard their necks with spiked collars. Wolves are proscribed animals, destroyed by pit-falls, traps, or poison; a peasant in France who kills a wolf, carries its head from village to village, and collects some small reward from the inhabitants: the Kirghis-Khaissaks take the wolves by the help of a large hawk called *berkut*, which is trained for the diversion, and will fasten on them and tear out their eyes. This island, a few centuries ago, was much infested by them. It was, as appears by Hollinghed, very noxious to the flocks in Scotland in 1577; nor was it entirely extirpated till about 1680, when

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The Wolf.



Fig. 1.
BULL DOG.



Fig. 2.
MASTIFF.



Fig. 3.
GRAY HOUND.



Fig. 4.
FOX.



Fig. 5.
WOLF.





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when the last wolf fell by the hand of the famous Sir Ewen Cameron. We may therefore with confidence assert the non-existence of these animals, notwithstanding M. de Buffon maintains that the English pretend to the contrary.—It has been a received opinion, that the other parts of these kingdoms were in early times delivered from this pest by the care of king Edgar. In England he attempted to effect it by commuting the punishments of certain crimes into the acceptance of a certain number of wolves tongues from each criminal; and in Wales, by converting the tax of gold and silver into an annual tax of 300 wolves heads. But, notwithstanding these his endeavours, and the assertions of some authors, his scheme proved abortive. We find, that, some centuries after the reign of that Saxon monarch, these animals were again increased to such a degree, as to become again the object of royal attention: accordingly Edward I. issued out his royal mandate to Peter Corbet to superintend and assist in the destruction of them in the several counties of Gloucester, Worcester, Hereford, Salop, and Stafford; and in the adjacent county of Derby, (as Camden, p. 902, informs us), certain persons at Wormhill held their lands by the duty of hunting and taking the wolves that infested the country, whence they were styled *wolve-hunt*. To look back into the Saxon times, we find, that in Athelstan's reign wolves abounded so in Yorkshire, that a retreat was built at Flixton in that county, "to defend passengers from the wolves, that they should not be devoured by them;" and such ravages did those animals make during winter, particularly in January, when the cold was severe, that the Saxons distinguished that month by the name of the *wolf-month*. They also called an outlaw *wolf's-head*, as being out of the protection of the law, proscribed, and as liable to be killed as that destructive beast. Ireland was infested by wolves for many centuries after their extinction in England; for there are accounts of some being found there as late as the year 1710, the last presentment for killing of wolves being made in the county of Cork about that time. [Plate LXXI. fig. 5.]

The Hyæna.

III. The *HYÆNA* has a strait jointed tail, with the hair of its neck erect, small naked ears, and four toes on each foot. It inhabits Asiatic Turkey, Syria, Persia, and Barbary. Like the jackal, it violates the repositories of the dead, and greedily devours the putrid contents of the grave; like it, preys on the herds and flocks; yet, for want of other food, will eat the roots of plants, and the tender shoots of the palms: but, contrary to the nature of the former, it is an unsociable animal; is solitary, and inhabits the chafms of the rocks. The superstitious Arabs, when they kill one, carefully bury the head, lest it should be employed for magical purposes; as the neck was of old by the Thesalian sorcerers.

Viscera non lyncis, non dire nodus hyænae
Defuili. Lucan, vi. 672.

The ancients were wild in their opinion of the *hyæna*: they believed that its neck consisted of one bone without any joint; that it changed its sex; imitated the human voice; had the power of charming the shepherds, and, as it were, rivetting them to the place they stood on: no wonder that an ignorant Arab should attribute preternatural powers to its remains. They are cruel, fierce, and untameable animals, of a most male-

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volent aspect; have a sort of obstinate courage, which will make them face stronger quadrupeds than themselves. Kæmpfer relates, that he saw one which had put two lions to flight, regarding them with the utmost coolness. Their voice is hoarse, a disagreeable mixture of growling and roaring.

Mr Pennant describes a variety of this species, undistinguished by former naturalists, which he calls the *spotted hyæna*. It has a large and flat head; some long hairs above each eye; very long whiskers on each side of the nose; a short black mane; hair on the body short and smooth; ears short and a little pointed, their outside black, inside cinereous; face and upper part of the head black; body and limbs reddish brown, marked with distinct black round spots; the hind legs with black transverse bars; the tail short, black, and full of hair. It inhabits Guinea, Ethiopia, and the Cape: lives in holes in the earth, or cliffs of the rocks; preys by night; howls horribly; breaks into the folds, and kills two or three sheep; devours as much as it can, and carries away one for a future repast; will attack mankind, scrape open graves, and devour the dead. Bosman has given this creature the name of *jackal*; by which Buffon being misled, makes it synonymous with the common jackal.

The Fox.

IV. The *VULPES*, or fox, has a strait tail, white at the point. His body is yellowish, or rather straw-coloured; his ears are small and erect; his lips are whitish, and his forefeet black. From the base of the tail a strong scent is emitted, which to some people is very fragrant, and to others extremely disagreeable. The fox is a native of almost every quarter of the globe, and is of such a wild and savage nature that it is impossible fully to tame him. He is esteemed to be the most crafty of all beasts of prey. His craftiness is chiefly discovered by the schemes he falls upon in order to catch lambs, geese, hens, and all kinds of small birds. When the females are in season, they make a disagreeable yelping noise in the night. It breeds only once in a year, (except some accident befalls the first litter), and brings four or five young, which, like puppies, are born blind. It is a common received opinion, that this animal will produce with the dog kind: which may be well founded; since it has been proved that the congenerous wolf will, as noticed above. The fox flies when he hears the explosion of a gun, or smells gunpowder. He is exceedingly fond of grapes, and does much mischief in vineyards. Various methods are daily employed to destroy foxes: they are hunted with dogs; iron traps are frequently set at their holes; and their holes are sometimes smoked to make them run out, that they may the more readily fall into the snares, or be killed by dogs or fire-arms. But all the arts that have been employed are insufficient for rooting them out of any country. They have so many passages in their dens, frequently at a great distance, that they often make their escape. The fox sleeps much in the day, but is in motion the whole night in search of prey. It will feed on flesh of any kind; but its favourite food is lambs, rabbits, hares, poultry, and feathered game: it will, when urged by hunger, eat carrots and insects; and those that live near the sea-coasts, for want of other food, will eat crabs, shrimps, or shell-fish. The fox is a great destroyer of rats, and field-mice; and, like the cat, will play with them a considerable time before

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The Fox.

before it puts them to death. When the fox has acquired a larger prey than it can devour at once, it never begins to feed till it has secured the rest, which it does with great address. It digs holes in different places; returns to the spot where it had left the booty; and (supposing a whole flock of poultry to have been its prey) will bring them one by one, and thrust them in with its nose, and then conceal them by ramming the loose earth on them till the calls of hunger incite him to pay them another visit. Of all animals the fox has the most significant eye, by which it expresses every passion of love, fear, hatred, &c. It is remarkably playful; but, like all savage creatures half reclaimed, will on the least offence bite those it is most familiar with. It is a great admirer of its bushy tail, with which it frequently amuses and exercises itself, by running in circles to catch it: and, in cold weather, wraps it round its nose. The smell of this animal is in general very strong, but that of the urine is remarkably fetid. This seems to offensive even to itself, that it will take the trouble of digging a hole in the ground, stretching its body at full length over it; and there, after depositing its water, cover it over with the earth, as the cat does its dung. The smell is so offensive, that it has often proved the means of the foxes escape from the dogs; who have so strong an aversion to the filthy effluvia, as to avoid encountering the animal it came from. It is said that the fox makes use of its urine as an expedient to force the cleanly badger from its habitation: whether that is the means, is rather doubtful; but that the fox makes use of the badger's hole, is certain: not through want of ability to form its own retreat, but to save itself some trouble; for after the expulsion of the first inhabitant, the fox improves as well as enlarges it considerably, adding several chambers, and providently making several entrances to secure a retreat from every quarter. In warm weather, it will quit its habitation for the sake of basking in the sun, or to enjoy the free air; but then it rarely lies exposed, but chooses some thick brake, that it may rest secure from surprize. Crows, magpies, and other birds, who consider the fox as their common enemy, will often, by their notes of anger, point out its retreat.—The skin of this animal is furnished with a warm soft fur, which in many parts of Europe is used to make muffs and to line clothes. Vast numbers are taken in Le Valais, and the Alpine parts of Switzerland. At Lausanne there are furriers who are in possession of between 2000 and 3000 skins, all taken in one winter. Plate LXXI. fig. 4.

Of the fox there are several varieties; as,

1. The field-fox, or *alopex* of Linnæus, who makes it a distinct species; but it is every way the same with the common fox, except in the point of the tail, which is black.

2. The cross-fox, with a black mark passing transversely from shoulder to shoulder, with another along the back to the tail. It inhabits the coldest parts of Europe, Asia, and North-America: a valuable fur, thicker and softer than the common sort: great numbers of the skins are imported from Canada.

3. The black fox is the most cunning of any, and its skin the most valuable; a lining of it is, in Russia, esteemed preferable to the finest fables: a single skin will sell for 400 rubles. It inhabits the northern parts

of Asia, and North-America. The last is inferior in goodness.

4. The brant fox, as described by Gesner and Linnæus, is of a fiery redness; and called by the first *brand-fuchz*, by the last *brandraef*: it is scarce half the size of the common fox: the nose is black, and much sharper; the space round the ears ferruginous; the forehead, back, shoulders, thighs, and sides black mixed with red, ash-colour and black; the belly yellowish; the tail black above, red beneath, and cinereous on its side. It is a native of Pennsylvania.

5. The coriac-fox, with upright ears, soft downy hair; tail bushy; colour in summer pale tawney, in winter grey: the base and tip of the tail black: a small kind. It inhabits the deserts beyond the Yaik: lives in holes: howls and barks: is caught by the Kirgis Khaissacks with falcons and grey-hounds: 40 or 50,000 are annually taken, and sold to the Russians, at the rate of 40 kopeiks, or 20 pence, each: the former use their skins instead of money: great numbers are sent into Turkey.

6. There are three varieties of foxes found in the mountainous parts of these islands, which differ a little in form, but not in colour, from each other. They are distinguished in Wales by as many different names. The *milgi*, or *grey-bound fox*, is the largest, tallest, and boldest; and will attack a grown sheep or wether: the *maffiff-fox* is less, but more strongly built: the *corgi*, or *cur-fox*, is the least; lurks about hedges, out-houses, &c. and is the most pernicious of the three to the feathered tribe. The first of these varieties has a white tag or tip to the tail; the last a black. When hunted, they never run directly forward, but make a great many doublings and turnings; and when in danger of being taken, they emit such a smell from their posteriors that the hunters can hardly endure it.

V. The *LAGOPUS*, or arctic fox, with a sharp nose; short rounded ears, almost hid in the fur; long and soft hair, somewhat woolly; short legs; toes covered on all parts, like that of a common hare, with fur; tail shorter and more bushy than that of the common fox, of a bluish grey or ash colour, sometimes white: the young of the grey are black before they come to maturity: the hair much longer in winter than summer, as is usual with animals of cold climates. It inhabits the countries bordering on the Frozen Sea; Khamtchatka, the isles between it and America, and the opposite parts of America discovered in captain Bering's expedition, 1741; is again found in Greenland, Iceland, Spitzbergen, Nova Zembla, and Lapland. It burrows underground, forms holes many feet in length; and strews the bottom with moss. In Greenland and Spitzbergen it lives in the cliffs of rocks, not being able to burrow, by reason of the frost: two or three pair inhabit the same hole. They are in heat about Lady-day; and during that time, they continue in the open air, but afterwards take to their holes. They go with young nine weeks: like dogs, they continue united, in copulation: they bark like that animal, for which reason the Russians call them *pesuzi*, or dogs. They have all the cunning of the common fox; prey on geese, ducks, and other water-fowl, before they can fly; on grouse of the country, on hares, and the eggs of birds; and in Greenland (through necessity), on berries, shell-fish, or any thing the sea flings up. But their prin-

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principal food in the north of Asia and in Lapland, is the leming, or Lapland marmot: those of the countries last mentioned are very migratory, pursuing the leming which is a wandering animal: sometimes these foxes will desert the country for three or four years, probably in pursuit of their prey; for it is well known that the migrations of the leming are very inconstant, it appearing in some countries only once in several years. The people of Jenesa suspect they go to the banks of the Oby. They are taken in traps: oft-times the glutton and great owl destroy them before the hunter can take them out: the skins are of small value: the great rendezvous of these animals is on the banks of the Frozen Sea, and the rivers that flow into it, where they are found in great troops.

The
Jackal, &c.

VI. The *AUREUS*, or jackal; of the form of a wolf, but much less; and the colour of a bright yellow. It inhabits all the hot and temperate parts of Asia; is found in Barbary and other parts of Africa as low as the Cape of Good Hope. They go in packs of 40, 50, and even of 200; and hunt like hounds in full cry, from evening to morning: they destroy the flocks and poultry; ravage the streets of villages, and gardens near towns, and will even destroy children that are unprotected: they will enter stables and out-houses, and devour skins, and any thing else formed of that material: there is scarce any animal they will leave unmolested: in default of living prey, they will feed on roots, fruits, and the most infected carrion: they will greedily disinter the dead, and feed on putrid corpses; for which reason, in many countries, the graves are made of a great depth, and well secured against their attacks: they attend caravans, and follow armies, in hopes that death will provide them a banquet: their howls and clamours are dreadful; and so loud, that people can scarce hear one another speak: during the day they are silent, and retire to their dens. Drellon says, that they are sometimes tamed, and kept among other domestic animals.

This animal is commonly called the *lion's provider*, from an opinion that it rouses the prey for that bad-nosed quadruped. The fact is, that every creature in the forest is set in motion by the fearful cries of the jackals; the lion, and other beasts of prey, by a kind of instinct, attend to the chase, and seize such timid animals as betake themselves to flight at the noise of this nightly pack. It is described by Oppian under the name *ΑΥΡΟΣ ΕΥΒΕΤΗΣ*, or *yellow wolf*; who mentions its horrible howl. It is strange that an animal so common in the Levant, should never have been brought over to be described by any modern naturalist. The descriptions yet remain very obscure; and there is still a great uncertainty whether the jackal and the adive of Mr Buffon are the same or different animals.

VII. The *MEXICANUS* has a smooth crooked tail. The body is ash-coloured, variegated with yellow spots. It is a native of Mexico, and is called the *mountain-cat* by Seba. It agrees with the European wolf in its manners; attacks cattle, and sometimes men.

VIII. The *THOUS* has a smooth crooked tail; the upper part of its body is grey, and its belly white. It is about the size of a large cat; and, according to Linnaeus, is found at Surinam: it is mentioned by no other naturalist.

CANIS Major, the *Great Dog*, in astronomy, a con-

stellation of the southern hemisphere, below Orion's feet, tho' somewhat to the westward of him. For the number of his stars, see *ASTRONOMY*, n° 206.

CANIS Minor, the *Little Dog*, in astronomy, a constellation of the northern hemisphere; called also by the Greeks *procyon*, and by the Latins *antecanis*, and *canicula*. See *CANICULA*; and *ASTRONOMY*, n° 206.

CANISIUS (Henry), a native of Nimeguen, and one of the most learned men of his time, was professor of canon law at Ingolstadt; and wrote a great number of books, the principal of which are, 1. *Summa Juris Canonici*. 2. *Antique lectiones*, a very valuable work. He died in 1609.

CANKER, a disease incident to trees, proceeding chiefly from the nature of the soil. It makes the bark rot and fall. If the canker be in a bough, cut it off; in a large bough, at some distance from the stem; in a small one, close to it: but for over-hot strong ground, the ground is to be cooled about the roots with pond-mud and cow-dung.

CANKER, among farriers, See *FARRIERY*, § xlv. 2.

CANNA, *INDIAN CANE*; a genus of the monogynia order, belonging to the monandria class of plants.

Species. 1. The indica, or common broad-leaved flowering cane, is a native of both Indies; the inhabitants of the British islands in America call it *Indian shot*, from the roundness and hardness of the seeds. It hath a thick, fleshy, tuberous root, which divides into many irregular knobs; it sends out many large oval leaves, without order. At their first appearance the leaves are like a twisted horn, but afterwards expand, and are near a foot long, and five inches broad in the middle; lessening gradually to both ends, and terminated in a point. The stalks are herbaceous, rising four feet high, and are encompassed by the broad leafy foot-stalks of the leaves; at the upper part of the stalk the flowers are produced in loose spikes, each being at first covered with a leafy hood, and turns to a brown colour. The flowers are succeeded by a fruit or capsule, oblong, rough, and crowned with the three-cornered empalement of the flower which remains. When the fruit is ripe, the capsule opens lengthwise into three cells, filled with round, shining, hard, and black seeds. 2. The latifolia, with a pale red flower, is a native of Carolina, and some other northern provinces of America. 3. The glauca, with a very large flower, is a native of South America. 4. The lutea, with obtuse, oval leaves, is less common in America than the other sorts. 5. The coccinea, hath larger leaves than any of the other species, and the stalks rise much higher. The flowers are produced in large spikes; and are of a bright crimson, or rather scarlet colour.

Culture. These plants must always be kept in pots of rich earth, to be moved to shelter in winter. They are propagated by seeds sown on a hot-bed in the spring; and in summer, when the plants are a little advanced in growth, prick them separately in small pots of rich earth, plunging them also in the hot-bed, giving shade, water, and fresh air; to which last harden them by degrees, till they bear it fully. In October they must be removed into a very good stove or greenhouse.

CANNABIS, *HEMP*; a genus of the pentandria order, belonging to the dioecia class of plants. Of this there is but one species, viz. the sativa. This is propa-

Canis
||
Cannabis.

Cannab.

Hemp.

Cannab.

pagated in the rich fenny parts of Lincolnshire in great quantities, for its bark, which is useful for cordage, cloth, &c. and the seeds abound with oil. Hemp is always sown on a deep, moist, rich soil, such as is found in Holland, Lincolnshire, the fens of the island of Ely, where it is cultivated to great advantage, as it might be in many other parts of England where there is a foil of the same kind; but it will not thrive on clayey or stiff cold land. The ground on which hemp is designed to be sown should be well ploughed, and made very fine by harrowing. About the middle of April the seed may be sown; three bushels is the usual allowance for an acre, but two are sufficient. In the choice of the seed, the heaviest and brightest coloured should be preferred; and particular care should be had to the kernel of the seed. For the greater certainty in this matter, some of the seeds should be cracked, to see whether they have the germ or future plant perfect: for, in some places, the male plants are drawn out too soon from the female; i. e. before they have impregnated the female plants with the farina; in which case, though the seeds produced by these females may seem fair to the eye, yet they will not grow*, according to the doctrine of Linnaeus. When the plants are come up, they should be hoed out in the same manner as is practised for turnips, leaving them two feet apart; observe also to cut down all the weeds, which, if well performed, and in dry weather, will destroy them. This crop, however, will require a second hoeing, in about six weeks after the first; and, if this is well performed, the crop will require no further care. The first season for pulling hemp is usually about the middle of August, when they begin to pull what they call the *finble hemp*, being that which is composed of the male plants; and it would be the much better method to defer this for a fortnight or three weeks longer, until those male plants have fully shed their farina or dust, without which the seeds will prove only empty hulks. These male plants decay soon after they have shed their farina. The second pulling is a little after Michaelmas, when the seeds are ripe. This is usually called *karle hemp*, and consists of the female plants which were left. This karle hemp is bound in bundles of a yard compass, according to statute measure, which are laid in the sun for a few days to dry; and then it is stacked up, or hoisted, to keep it dry till the seed can be threshed out. An acre of hemp, on a rich soil, will produce near three quarters of seed, which, together with the unwrought hemp, is worth from six to eight pounds. Hemp is esteemed very effectual for destroying weeds: but this it accomplishes by impoverishing the ground, and thus robbing them of their nourishment; so that a crop of it must not be repeated on the same spot.—From the leaves of hemp pounded and boiled in water, the natives of the East Indies prepare an intoxicating liquor of which they are very fond. The plant, when fresh, has a rank narcotic smell; the water in which the stalks are soaked, in order to separate the tough rind for mechanic uses, is said to be violently poisonous, and to produce its effects almost as soon as drunk. The seeds also have some smell of the herb, and their taste is unctuous and sweetish: they are recommended, boiled in milk, or triturated with water into an emulsion, against coughs, heat of urine, and the like. They are also said to be useful in incontinence of

urine, and for restraining venereal appetites; but experience does not warrant their having any virtues of that kind.

CANNÆ, (anc. geog.), a mean hamlet of Apulia in the Adriatic, at the mouth of the river Aufidus; raised out of obscurity by a most terrible overthrow given the Romans by the Carthaginians under Hannibal. The Roman consuls were C. Terentius Varro, and L. Emilius Paulus. Their army was vastly superior in numbers to the Carthaginians; but the latter were superior in cavalry. Notwithstanding, however, that the Romans were no fewer than 87,000, so great was the fame of Hannibal, that the consuls were divided in their opinion as to the venturing of an engagement. Emilius was for avoiding a battle, and accordingly encamped on the eminences where the cavalry of the enemy could not act; but next day, it being Varro's turn to command, he advanced into the plain in which Cannæ was situated, and brought the army into such a situation that an engagement became unavoidable. The Romans were then drawn up in the usual manner; the *hæstati* in the first line, the *principes* in the second, and the *triarii* in the third. The cavalry were posted on the wings. On the right, the Roman knights flanked the legionaries; in the left, the cavalry of the allies covered their own infantry. The two consuls commanded the two wings, Emilius the right, and Terentius the left; and the two procursors Servilius and Attilius the main body. On the other hand, Hannibal, whose army consisted of 40,000 foot, and 10,000 horse, placed his Gaulish and Spanish cavalry in his left wing, to face the Roman knights; and the Numidian horse in his right, over against the cavalry of the allies of Rome. As to his infantry, he divided the African battalions into two bodies; one of which he posted near the Gaulish and Spanish horse, the other near the Numidian. Between these two bodies were placed on one side the Gaulish, on the other the Spanish infantry, drawn up in such a manner as to form an obtuse angle projecting a considerable way beyond the two wings. Behind this line he drew up a second which had no projection. Asdrubal commanded the left wing; Maherbal the right; and Hannibal himself, with his brother Mago, the main body. He had also taken care to post himself in such a manner that the wind *Vulturnus*, which rises at certain stated times, should blow directly in the faces of the Romans during the fight, and cover them with dust. The onset was begun by the light-armed infantry; the Romans discharging their javelins, and the *baleares* their stones, with pretty equal success; nevertheless, the consul Emilius was wounded. Then the Roman cavalry in the right wing advanced against the Gaulish and Spanish in Hannibal's left. As they were shut in by the river Aufidus on one side, and by their infantry on the other, they did not fight, as usual, by charging and wheeling off, and then returning to the charge; but continued fighting each man against his adversary, till one of them was killed or retired. After they had made prodigious efforts on both sides to overbear each other, they all on a sudden dismounted, and fought on foot with great fury. In this attack the Gauls and Spaniards soon prevailed; put the Romans to the rout; and, pursuing them along the river, strewed the ground with their dead bodies, Asdrubal giving no quarter. This

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*See Botany, sect. iii.

Cannæ
Cannon.

action was scarce over, when the infantry on both sides advanced. The Romans first fell upon the Spaniards and Gauls, who, as already observed, formed a kind of triangle projecting beyond the two wings. These gave ground, and, pursuant to Hannibal's directions, sunk into the void space in their rear; by which means they insensibly brought the Romans into the centre of the African infantry, and then the fugitives rallying, attacked them in front, while the Africans charged them in both flanks. The Romans, being by this artful retreat drawn into the snare and surrounded, no longer kept their ranks, but formed several platoons, in order to face every way. Emilius, who was on the right wing, seeing the danger of the main body, at the head of his legionaries acted the part both of a soldier and general, penetrating into the heart of the enemy's battalions, and cutting great numbers of them in pieces. All the Roman cavalry that were left, attended the brave consul on foot; and, encouraged by his example, fought like men in despair. But, in the mean time, Afrubal, at the head of a detachment of Gaulish and Spanish infantry brought from the centre, attacked Emilius's legionaries with such fury, that they were forced to give ground and fly: the consul being all covered with wounds, was at last killed by some of the enemy who did not know him. In the main body, the Romans, though involved on all sides, continued to sell their lives dear; fighting in platoons, and making a great slaughter of the enemy. But being at length overpowered, and disheartened by the death of the two proconsuls Servilius and Attilius who headed them, they dispersed and fled, some to the right, and others to the left, as they could find opportunity; but the Numidian horse cut most of them in pieces: the whole plain was covered with heaps of dead bodies, inasmuch that Hannibal himself, thinking the butchery too terrible, ordered his men to put a stop to it.—There is a great disagreement among authors as to the number of Romans killed and taken at the battle of Cannæ. According to Livy, the republic lost 50,000 men including the auxiliaries. According to Polybius, of 6000 Roman horse, only 700 escaped to Venusia with Terentius Varro, and 300 of the auxiliary horse. As to the infantry, that writer tells us, that 70,000 of the Roman foot died on the field of battle fighting like brave men; and that 13,000 were made prisoners. According to Dionysius of Halicarnassus, of 6000 horse, only 370 escaped the general slaughter, and of 80,000 foot, 3000 only were left. The most moderate computation makes the number of Romans killed to amount to 45,000.

CANNEL COAL. See AMPHELITES.

CANNES, a town of France, in Provence, and in the viceroy of Grasse, seated on the coast of the Mediterranean sea, with a harbour and a castle. E. Long. 7. 7. N. Lat. 43. 34.

CANNON, a military engine for throwing balls, &c. by the help of GUNPOWDER.

The invention of brass cannon is by Laney ascribed to J. Owen: he says, that they were first known in England in the year 1535; but yet acknowledges, that, in 1346, there were four pieces of cannon in the English army at the battle of Cressly, and that these were the first that were known in France. And Mezeray relates, that king Edward, by five or six pieces

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of cannon, struck terror into the French army, it being the first time they had seen any of these thundering machines *. The Germans carry the invention farther back, and attribute it to Albertus Magnus, a Dominican monk, about the year 1250. Vossius rejects all these opinions, and finds cannon in China almost 1700 years ago. According to him, they were mounted by the emperor Kiteiy in the year of Christ 85.

For the casting of cannon, see FOUNDERY. For their different parts, proportions, management, operation, and effects, see GUNNERY.

CANNON, with letter-founders and printers, the name of the largest size of letters they use.

CANNONADE, the application of artillery to the purposes of war, or the direction of its efforts against some distant object intended to be seized or destroyed, as a ship, battery, or fortress. See GUNNERY.

Since a large ship of war may be considered as a combination of floating batteries, it is evident that the efforts of her artillery must be greatly superior to those of a fortress on the sea-coast; that is to say, in general; because, on some particular occasions, her situation may be extremely dangerous, and her cannonading ineffectual. Her superiority consists in several circumstances, as the power of bringing her different batteries to converge to one point; of shifting the line of her attack so as to do the greatest possible execution against the enemy, or to lie where she will be the least exposed to his shot; and chiefly because, by employing a much greater number of cannon against a fort than it can possibly return, the impression of her artillery against stone-walls soon becomes decisive and irresistible. Besides these advantages in the attack, she is also greatly superior in point of defence: because the cannon-ship, passing with rapidity through her sides, seldom do any execution out of the line of their flight, or occasion much mischief by their splinters; whereas they very soon shatter and destroy the faces of a parapet, and produce incredible havoc among the men by the fragments of the stones, &c. A ship may also retreat when she finds it too dangerous to remain longer exposed to the enemy's fire, or when her own fire cannot produce the desired effect. Finally, the fluctuating situation of a ship, and of the element on which she rests, renders the effects of bombs very uncertain, and altogether destroys the effect of the *ricochet*, or rolling and bounding shot, which is so pernicious and destructive in a fortress or land engagement. The chief inconvenience to which a ship is exposed, on the contrary, is, that the low-laid cannon in a fort near the brink of the sea, may strike her repeatedly on or under the surface of the water, so as to sink her before her cannonade can have any considerable efficacy.

CANNULA, in surgery, a tube made of different metals, principally of silver and lead, but sometimes of iron.

They are introduced into hollow ulcers, in order to facilitate a discharge of pus or any other substance; or into wounds, either accidental or artificial, of the large cavities, as the thorax or abdomen: they are used in the operation of bronchotomy; and, by some, after cutting for the stone, as a drain for urine.

Other cannulas are used for introducing cauteries, either actual or potential, into hollow parts, in order to guard the parts adjacent to that to be cauterized,

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Cannon.
Cannula.
* See *Artillery*.

from injury. They are of various figures; some being oval, some round, and others crooked.

CANO, a kingdom of Africa, in Negroland, with a town of the same name. It is bounded by Zaara on the north, by the river Niger on the south, the kingdom of Agades on the west, and that of Cassina on the east. Some of the inhabitants are herdsmen, and others till the ground and dwell in villages. It produces corn, rice, and cotton. Here are also many deserts, and mountains covered with woods, in which are wild citrons and lemon-trees. The walls and houses of the town are made of clay, and the principal inhabitants are merchants. E. Long. 16. 18. N. Lat. 21. 5.

CANOBIA, a town of Italy, in the duchy of Milan, situated on the western bank of Lago Maggiore, or the Greater Lake. E. Long. 8. 47. N. Lat. 45. 55.

CANOE, a sort of Indian boat or vessel, formed of the trunk of a tree hollowed, and sometimes of several pieces of the bark put together.

Canoes are of various sizes, according to the uses for which they may be designed, or the countries wherein they are formed. The largest are made of the cotton tree; some of them will carry between 20 and 30 hogheads of sugar or molasses. Some are made to carry sail: and for this purpose are steeped in water till they become pliant; after which their sides are extended, and strong beams placed between them, on which a deck is afterwards laid that serves to support their sides. The other sorts very rarely carry sail, unless when going before the wind: their sails are made of a sort of short silk grass or rushes. They are commonly rowed with paddles, which are pieces of light wood somewhat resembling a corn-funnel; and, instead of rowing with it horizontally like an oar, they manage it perpendicularly. The small canoes are very narrow, having only room for one person in breadth, and seven or eight lengthwise. The rowers, who are generally American savages, are very expert in managing their paddles uniformly, and in balancing the canoes with their bodies; which would be difficult for a stranger to do, how well accustomed soever to the conducting of European boats, because the canoes are extremely light, and liable to be overturned. The American Indians, when they are under the necessity of landing to avoid a water-fall, or of crossing the land from one river to another, carry their canoes on their heads, till they arrive at a place where they can launch them again.—This is the general construction of canoes, and method of managing them: but some nations have vessels going under the name of canoes, which differ considerably from the above; as the inhabitants of Greenland, Hudson's-bay, Otaheite, &c. See GREENLAND, &c.

CANON, commonly called *prebendary*, a person who possesses a prebend, or revenue allotted for the performance of divine service in a cathedral or collegiate church. Originally, canons were only priests, or inferior ecclesiastics, who lived in community, residing near the cathedral church to assist the bishop, depending entirely on his will, supported by the revenues of his bishopric, and living in the same house as his domestics or counsellors, &c. By degrees these communities of priests, shaking off their dependence, formed separate bodies; in time they freed themselves from their rules, and at length ceased to live in a community. It is maintained, that the colleges of canons, which have

been introduced into each cathedral, were not in the ancient church, but are of modern appointment.

In the Romish church, when a person is promoted to the office of a canon, he must be presented in a very ceremonious manner to the chapter, who assemble in the cathedral, in order to receive him: he kisses the altar thrice, after which he goes and takes his place in the choir; he afterwards makes his confession of faith aloud, and swears to observe the ordinances of the church and his holiness the pope: being thus solemnly installed, he is empowered to assist at the chapter, to chaunt the office of the choir, &c.

Canons are of various kinds; as,

Cardinal CANONS, those attached, or, as the Latins call it, *incardinati*, to a church, as a priest is to a parish.

Domicellary CANONS, young canons, who, not being in orders, had no right in any particular chapters.

Expectative CANONS were such as, without having any revenue or prebend, had the titles and dignities of canons, a voice in the chapter, and a place in the choir, till such time as a prebend should fall.

Foreign CANONS, such as did not officiate in the canonries to which they belonged. To these were opposed *manfionary* canons.

Regular CANONS, those who still live in community, and who, like religious, have, to the practice of their rules, added the solemn profession of vows.

Tertiary CANON, a person who had only the third part of the revenues of the canonicate.

CANON, in an ecclesiastical sense, a law, rule, or regulation of the policy and discipline of a church, made by councils either general, national, or provincial.

CANONS of the *Apostles*, a collection of ecclesiastical laws, which, though very ancient, were not left us by the apostles. It is true, they were sometimes called *apostolic canons*; but this means no more than that they were made by bishops, who lived soon after the apostles, and were called *apostolical men*. They consist of regulations, which agree with the discipline of the second and third centuries: The Greeks generally count 85; but the Latins receive only 50, nor do they observe all these.

CANON of *Mass*, in the Romish church, the name of a prayer which the priest reads low to himself, the people kneeling.

In this part of the mass, the priest particularly mentions some persons for whom he is going to offer the sacrifices, and prays to God for the redemption of their souls, the hopes of their salvation, &c.

Paschal CANON, a table of the moveable feasts, shewing the day of Easter, and the other feasts depending on it, for a cycle of 19 years.

CANON of *Scripture*, a catalogue or list of the inspired writings; or such books of the Bible as are called *canonical*, because they are in the number of those books which are looked upon as sacred, in opposition to those which either are not acknowledged as divine books, or are rejected as spurious, and are called *apocryphal*.

The canon of Scripture may be considered either as Jewish or Christian, with respect to the sacred writings acknowledged as such by the Jews, and those admitted by the Christians.

The first canon, or catalogue of the sacred books, was

was made by the Jews; but who was the author of it, is not so certain. The five books of Moses were, questionless, collected into one body within a short time after his death; since Deuteronomy, which is an abridgement of the other four, was laid in the tabernacle near the ark, according to the command he gave to the Levites: so that the first canon of the sacred writings consisted only of the five books of Moses. There were no more added to them till the division of the ten tribes; since the Samaritans acknowledged none else. However, since Moses, there were several prophets and other writers divinely inspired, who composed either the history of their own times, or prophetic books, and divine writings, or psalms to the praise of God; but it cannot be discovered that, any time before the captivity, they were collected into one body, and comprised under one and the same canon. It is evident that, in our Saviour's time, the canon of the Holy Scripture was already drawn up, since he cites the laws of Moses, the prophets, and the psalms, which are the three sorts of books of which that canon is composed, and which he often styles the *Scripture*, or the *Holy Scripture*.

It is generally received, that Ezra was the principal author of this canon, though Nehemiah had some share in it; and that he re-established, corrected, and ordered the sacred books to be written in new characters.

The Jewish canon is generally called the *canon of Ezra*: but it is certain, that all the books were not received into the canon of the Scriptures in his time; for Malachi, it is supposed, lived after him; and, in Nehemiah, mention is made of Jaddua the high priest, and of Darius Codomanus, a king of Persia, who lived at least 100 years after his time. Dr Prideaux, with great appearance of reason, says, it is most probable, that the two books of Chronicles, Ezra, Nehemiah, and Esther, as well as Malachi, were afterwards added in the time of Simeon the just; and that it was not till then that the Jewish canon of the Holy Scripture was fully completed. And, indeed, these last books seem very much to want the accuracy and skill of Ezra, in their publication; for they fall short of the exactness found in the other parts of the Hebrew Scriptures. There are some authors who pretend, that the Jews have made one or more canons; and that they have added to the former the books of Tobit, Judith, Ecclesiasticus, Wisdom, and the Maccabees: but it is most evidently true, that the Jews had no other canon but that of Ezra, nor confessed any other books for sacred but those it contains. The two assemblies of the synagogue, which, as it is pretended, were held for that purpose, are mere chimeras; nor have any ancient writers said any thing of them.

As for the Christian church, there is no doubt but it acknowledged those books to be canonical, which were cited as of divine authority, by Christ and his apostles: the ancient catalogues of the canonical books of the Old Testament, which are to be met with in Christian writers, are conformable to the canon of the Jews, and contain no other books; the Christian church, for several of the first ages, receiving the inspired writers no further than the Jewish canon. The first and most ancient catalogue of this kind, is that of Malito, bishop of Sardis, who flourished in the reign of Marcus Antoninus. It agrees with the Jewish canon,

excepting his omission of Esther, and that he makes Ruth and Judges two books. Origen has given us a list of the sacred books, in which he takes in Esther, and joins Ruth with Judges. St Gregory Nazianzen divides the books of Scripture into historical, poetical, and prophetic: he reckons 12 historical books, viz. the five books of Moses, with Joshua, Judges, Ruth, the two books of Kings, Chronicles, and Esdras. Five poetical books, Job, Daniel, and the three books of Solomon. Five prophetic books, viz. four great prophets, and 12 small ones. The council of Laodicea was the first synod in which the number of the canonical books was ascertained: this council assigns only 22 books to the Old Testament, including Esther, and joining Baruch and the Lamentations with Jeremiah. St Epiphanius reckons 27 canonical books of the Old Testament; yet he admits no more than are in the catalogue of Origen, and observes that the Jews had reduced them to 22. The third council of Carthage, in the year 397, admitted the books of Wisdom, Ecclesiasticus, Tobit, Judith, and the two books of Maccabees, into the canon. The church of Rome has agreed herein with that of Africa: for Innocent I. in his letter to Exuperius, places the same books in the canon of Scripture, as pope Gelasius, in the council held in the year 494; and the decree of pope Eugenius, and the canon of the council of Trent, agree with the canon of the council of Carthage. That the council of Trent had no prior authority to proceed on, excepting some slender pretence from the council of Carthage above mentioned, appears from the current testimony of the Latin church.

As to the canon of the New Testament, it is to be observed, that the four Evangelists, the Acts of the Apostles, all the Epistles of St Paul except that to the Hebrews, and the first Epistles of St Peter and St John, have been received as canonical by the unanimous consent of all the churches in all times: the Epistle of St James, that of St Jude, the second Epistle of St Peter, and the second and third Epistles of St John, were not received by all the churches from the beginning, as canonical; but have since been acknowledged as genuine, and therefore admitted into the canon.

We must observe, that the canon of the New Testament was neither settled by any synod, or single authority: this collection was formed upon the unanimous consent of all the churches, who, by constant tradition, reaching to the apostolical age, had received such a number of them as were written by inspired authors.

CANON, in monastic orders, a book wherein the religious of every convent have a fair transcript of the rules of their order, frequently read among them, as their local statutes.

CANON is also used for the catalogue of saints acknowledged and canonized in the Romish church.

CANON, in music. In modern music it is a kind of fugue which they call a *perpetual fugue*, because the different parts, beginning one after another, repeat incessantly the same air.

Formerly, says Zarlino, they placed, at the head of perpetual fugues, particular directions which shewed how this kind of fugues was to be sung; and these directions being properly the rules by which perpetual

fugues were composed were called *canoni*, *rules* or *canons*. From this custom, others taking the title for the thing signified, by a metonymy, termed this kind of composition *canon*. Such canons as are composed with the greatest facility, and of consequence most generally used, begin the fugue either with the octave or the unison; that is to say, that every part repeats in the same tone the melody of the preceding: in order to form a canon of this kind, it is only necessary for the composer to make an air according to his taste; to add in score as many parts as he chuses, where the voices in octave or unison repeat the same melody; then forming a single air from all these parts successively executed, to try whether this succession may form an entire piece which will give pleasure, as well in the harmony as the melody.

In order to execute such a *canon*, he who sings the first part begins alone, and continues till the air is finished; then recommences immediately, without any suspension of sound or interruption of time: as soon as he has ended the first couplet, which ought to serve for the perpetual subject upon which the whole *canon* has been composed, the second part begins and repeats the same couplet, whilst the first who had begun pursues the second: others in succession begin, and proceed the same way, as soon as he who precedes has reached the end of the first couplet. Thus, by incessantly recommencing, an universal cloze can never be found, and the *canon* may be repeated as long as the singers please.

A perpetual fugue may likewise consist of parts which begin with the intervals of a fourth or fifth; or, in other words, every part may repeat the melody of the first, a fourth or a fifth higher or lower. It is then necessary that the whole *canon* should be invented *di prima intenzione*, as the Italians say; and that sharps or flats should be added to the notes, whose natural gradations do not answer exactly, by a fourth or fifth, to the melody of the preceding part, and produce the same intervals with itself. Here the composer cannot pay the least regard to modulation; his only care is, that the melody may be the same, which renders the formation of a *canon* more difficult; for at every time when any part resumes the fugue, it takes a new key; it changes the tone almost at every note, and what is still worse, no part is at the same time found in the same tone with another; hence it is that this kind of *canons*, in other respects, far from being easy to be pursued, never produces a pleasing effect, however good the harmony may be, and however properly it may be sung.

There is a third kind of *canon*, but very scarce, as well because it is extremely difficult, as because it is for the most part incapable of giving pleasure, and can boast no other merit but the pains which have been thrown away in its composition. This may be called a *double canon inverted*, as well by the inversions which are practised in it with respect to the melody of the parts, as by those which are found among the parts themselves, in singing. There is such an artifice in this kind of *canon*, that, whether the parts be sung in their natural order, or whether the paper in which they are set be turned the contrary way, to sing them backward from the end to the beginning, in such a manner that the bass becomes the upper part, and the rest undergo a similar change, still you have pretty harmony, and still a regular *canon*. The reader may consult Rousseau's

Dictionary in this article, where he is referred to plate D fig. 11. for two examples of canons of this sort extracted from Bontempi, who likewise gives rules for their composition. But he adds, that the true principle from which this rule is deduced will be found at the word *Système*, in his account of the system of Tartini, to which we must likewise once more refer the reader; as a quotation of such length must have protracted our article to an enormous extent.

To form a *canon* in which the harmony may be a little varied, it is necessary that the parts should not follow each other in a succession too rapid, and that the one should only begin a considerable time after the other. When they follow one another so immediately as at the distance of a semibreve or a minim, the duration is not sufficient to admit a great number of chords, and the *canon* must of necessity exhibit a disagreeable monotony; but it is a method of composing, without much difficulty, a *canon* in as many parts as the composer chuses. For a *canon* of four bars only, will consist of eight parts if they follow each other at the distance of half a bar; and by each bar which is added, two parts will constantly be gained.

The emperor Charles VI. who was a great musician and composed extremely well, took much pleasure in composing and singing *canons*. Italy is still replete with most beautiful *canons* composed for this prince, by the best masters in that country. To what has been said by Rousseau, we need only subjoin, that the English *catch* and the Italian *canon* are much the same; as any intelligent reader may perceive, from comparing the structure and execution of the English *catch* with the account of *canons* which has now been given.

CANON-LAW, a collection of ecclesiastical laws, serving as the rule and measure of church-government.

The power of making laws was exercised by the church before the Roman empire became Christian. The canon-law that obtained throughout the West, till the 12th century, was the collection of canons made by Dionysius Exiguus in 520, the capitularies of Charlemagne, and the decrees of the popes from Siricius to Anastasius.

The canon-law, even when papal authority was at its height in England, was of no force when it was found to contradict the prerogative of the king, the laws, statutes, and customs of the realm, or the doctrine of the established church.

The ecclesiastical jurisdiction of the see of Rome in England was founded on the canon-law; and this created quarrels between kings and several archbishops and prelates who adhered to the papal usurpation.

Besides the foreign canons, there were several laws and constitutions made here for the government of the church: but all these received their force from the royal assent; and if, at any time, the ecclesiastical courts did, by their sentence, endeavour to enforce obedience to such canons, the courts at common law, upon complaints made, would grant prohibition. The authority vested in the church of England of making canons, was ascertained by a statute of Henry VIII. commonly called the *act of the clergy's submission*; by which they acknowledged, that the convocation had always been assembled by the king's writ; so that though the power of making canons resided in the clergy met in convocation, their force was derived from the authority of the

Canonefs
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Canonical.

the king's assenting to and confirming them.

The old canons continued in full force till the reign of James I. when the clergy being assembled in convocation, the king gave them leave to treat and consult upon canons; which they did, and presented them to the king, who gave them the royal assent: these were a collection out of the several preceding canons and injunctions. Some of these canons are now obsolete. In the reign of Charles I. several canons were passed by the clergy in convocation.

CANONESS, in the Romish church, a woman who enjoys a prebend, affixed, by the foundation, to maids, without their being obliged to renounce the world or make any vows.

CANONICA, in philosophical history, an appellation given by Epicurus to his doctrine of logic. It was called *canonica*, as consisting of a few canons or rules for directing the understanding in the pursuit and knowledge of truth. Epicurus's *canonica* is represented as a very slight and insufficient logic by several of the ancients, who put a great value on his ethics and physics. Laetius even assures us, that the Epicureans rejected logic as a superfluous science; and Plutarch complains that Epicurus made an unskilful and preposterous use of syllogisms. But these censures seem too severe. Epicurus was not averse to the study of logic, but even gave better rules in this art than those philosophers who aimed at no glory but that of logics. He only seems to have rejected the dialectics of the stoics, as full of vain subtleties and deceits, and fitted rather for parade and disputation than real use. The stress of Epicurus's *canonica* consists in his doctrine of the criteria of truth. All questions in philosophy are either concerning words or things: concerning things, we seek their truth; concerning words, their signification: things are either natural or moral; and the former are either perceived by sense, or by the understanding. Hence, according to Epicurus, arise three criterions of truth, *viz.* sense, anticipation or prenotation, and passion. The great canon or principle of Epicurus's logic is, that the senses are never deceived; and therefore, that every sensation or perception of an appearance is true.

CANONICAL, something that belongs to, or partakes of the nature of, a rule or canon.

CANONICAL Obedience, is that submission which, by the ecclesiastical laws, the inferior clergy are to pay to their bishops, and religious to their superiors.

CANONICAL Sins, in the ancient church, those which were capital or mortal. Such especially were idolatry, murder, adultery, heresy, and schism.

CANONICAL Punishments, are those which the church may inflict; such as excommunication, degradation, and penance, in Roman Catholic countries, also fasting, alms, whipping, &c.

CANONICAL Life, the method or rule of living prescribed by the ancient clergy who lived in community. The canonical life was a kind of medium between the monastic and clerical lives. Originally the orders of monks and clerks were entirely distinct; but pious persons, in process of time, instituted colleges of priests and canons, where clerks brought up for the ministry, as well as others already engaged therein, might live under a fixed rule, which, though somewhat more easy than the monastic, was yet more restrained than the secular. This was called the *canonical life*, and those

Canonical
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Canonization.

who embraced it *canons*.—Authors are divided about the founder of the canonical life. Some will have it to be founded by the apostles: others ascribe it to pope Urban I. about the year 1230, who is said to have ordered bishops to provide such of their clergy as were willing to live in community, with necessities out of the revenues of their churches. The generality attribute it to St Augustine; who, having gathered a number of clerks to devote themselves to religion, instituted a monastery within his episcopal palace, where he lived in community with them. Onuphrius Panvinus brings the institution somewhat lower; according to him, pope Gelasius I. about the year 495, placed the first regular canons of St Augustin in the Lateran church.

CANONICAL Letters, in the ancient church, were a sort of testimonials of the orthodox faith, which the bishops and clergy sent each other to keep up the catholic communion, and distinguish orthodox Christians from Arians and other heretics. They were denominated *canonical*, either as being composed according to a certain rule or form; or because they were given to the *canonici*, that is, those comprehended in the canon or catalogue of their church. When they had occasion to travel into other dioceses or countries, dimissory and recommendatory letters, also letters of peace, &c. were so many species of canonical letters.

CANONICAL is also an appellation given to those epistles in the New Testament more frequently called *catholic* or *general* epistles.

CANONIST, a person skilled in, or who makes profession of the study and practice of, the canon law. Canonists and civilians are usually combined in the same persons: And hence the title of *doctor juris utriusque*, or *legum doctor*, usually expressed in abbreviation, L.L.D. or J.U.D.

CANONIZATION, a ceremony in the Romish church, by which persons deceased are ranked in the catalogue of the saints. It succeeds beatification *.

* See Beatification.

Before a beatified person is canonized, the qualifications of the candidate are strictly examined into, in some consistories held for that purpose; after which, one of the consistorial advocates, in the presence of the pope and cardinals, makes the panegyric of the person who is to be proclaimed a saint, and gives a particular detail of his life and miracles: which done, the holy father decrees his canonization, and appoints the day.

On the day of canonization the pope officiates in white, and their eminences are dressed in the same colour. St Peter's church is hung with rich tapestry, upon which the arms of the pope, and of the prince or state requiring the canonization, are embroidered in gold and silver. An infinite number of lights blaze all round the church, which is crowded with pious souls, who wait with devout impatience till the new saint has made his public entry as it were into paradise, that they may offer up their petitions to him without danger of being rejected.

The following maxim with regard to canonization is now observed, though it has not been followed above a century, *viz.* not to enter into the inquiries prior to canonization, till 50 years, at least, after the death of the person to be canonized. By the ceremony of canonization, it appears that this rite of the modern Romans has something in it very like the apotheosis or deification of the ancient Romans, and, in all probability, takes

takes its rise from it; at least several ceremonies of the same nature are conspicuous in both.

CANONRY, the benefice filled by a canon. It differs from a prebend, in that the prebend may subsist without the canonicate; whereas the canonicate is inseparable from the prebend: again the rights of suffrages, and other privileges, are annexed to the canonicate, and not to the prebend.

CANOPUS, in astronomy, a star of the first magnitude in the rudder of Argo, a constellation of the southern hemisphere. See **ASTRONOMY**, n° 206.

CANOPUS, in Pagan mythology, one of the deities of the ancient Egyptians, and, according to some, the god of water. It is said, that the Chaldeans, who worshipped fire, carried their fancied deity thro' other countries to try its power, in order that, if it obtained the victory over the other gods, it might be acknowledged as the true object of worship; and it having easily subdued the gods of wood, stone, brass, silver, and gold, its priests declared, that all gods did it homage. This the priests of Canopus hearing, and finding that the Chaldeans had brought their god to contend with Canopus, they took a large earthen vessel, in which they bored several holes, which they afterwards stopp'd with wax, and having filled the vessel with water, painted it of several colours, and sitting the head of an idol to it, brought it out, in order to contend with the Chaldean deity. The Chaldeans accordingly kindled their fire all around it; but the heat having melted the wax, the water gushed out thro' the holes, and extinguished the fire; and thus Canopus conquered the god of the Chaldeans.

CANOPUS, or *Canobus*, according to Strabo, had been Menelaus's pilot, and had a temple erected to him in a town called *Canopus*, near one of the mouths of the Nile. Dionysius mentions it:

Καὶ πλοῖον ἐπὶ τῷ Ἀμύκλῳ Ἀρκυκλῷ οἷοι Κανόβῳ.
There stands Canobus' temple known to fame;
The pilot who from fair Amycla came.

Vossius remarks, on this occasion, the vanity of the Greeks, who, as he conjectures, hearing of an Egyptian deity named *Canopus*, took from thence an opportunity of deifying the pilot of Menelaus who bore the same name, and giving out that the Egyptian god Canopus had been a Greek: F. Monfaucou gives several representations of this deity. Once, in allusion to the victory abovementioned, throws out water on every side through little holes.

CANSO, a sea-port town of Acadia, or Nova Scotia, in North America, seated on a narrow strait which separates Nova Scotia from Cape Breton. Near this town is a fine fishery for cod. W. Long. 62. N. Lat. 46.

CANSTAT, a town of Swabia, in Germany, in the duchy of Wirtemberg, situated on the river Neckar, in E. Long. 9. 9. N. Lat. 48. 51.

CANT, a quaint affected manner of speaking, adapted chiefly to the lower sort. Skinner racks his invention for the origin of this word; which he successively deduces from the German, Flemish, and Saxon tongues. According to the general opinion, Cant is originally the proper name of a Cameronian preacher in Scotland, who by exercise had obtained the faculty of talking in the pulpit in such a tone and dialect as was understood by none but his own congregation: since

Andrew Cant's time, the word has been extended to signify all sudden exclamations, and whining unmusical tones, especially in praying and preaching. But this origin of the word has been disputed by others; and perhaps the true derivation is from the Latin *cantare* "to sing."

CANT is also applied to words and phrases affected by particular persons or professions for low ends, and not authorised by the established language *. The difference between *cant* and *technical* seems to be this: the former is restrained to words introduced out of folly, affectation, or imposture; the latter is applied to such as are introduced for the sake of clearness, precision, and significancy.

CANT-TIMBERS, in ship-building, those timbers which are situated at the two ends of a ship. They derive their name from being *canted*, or raised obliquely from the keel; in contradistinction from those whose planes are perpendicular to it. The upper ends of those on the *bow*, or fore-part of the ship, are inclined to the stern; as those in the *after*, or hind part, incline to the stern-post above. See **SHIP-BUILDING**.

CANTABRIA, (anc. geog.), a district of Terraconensis, on the Oceanus Cantabricus or bay of Biscay; now **BISCAY**. The inhabitants were famous for their warlike character. In conjunction with the Asturians *, they carried on desperate wars with the Romans; but were subdued by them, about 25 years before Christ. Being impatient, however, of a foreign yoke, they in a few years revolted. Most of their youth had been already taken prisoners by the Romans, and sold for slaves to the neighbouring nations: but having found means to break their chains, they cut the throats of their masters; and returning into their own country, attacked the Roman garriisons with incredible fury.

Agrippa marched against them with great expedition; but, on his arrival, met with so vigorous a resistance, that his soldiers began to despair of ever being able to reduce them. As the Cantabrians had waged war with the Romans for upwards of 200 years, they were well acquainted with their manner of fighting, no way inferior to them in courage, and were now become desperate; well knowing, that if they were conquered, after having so often attempted to recover their liberty, they must expect the most severe usage, and cruel slavery. Animated with this reflection, they fell upon the Romans with a fury hardly to be expressed, routed them in several engagements, and defended themselves when attacked by the enemy with such intrepidity, that Agrippa afterwards owned, that he had never, either by sea or land, been engaged in a more dangerous enterprise. That brave commander was obliged to use in-treaties, menaces, and to brand some of his legionaries with ignominy, before he could bring them to enter the lists with such a formidable enemy. But having at last, with much ado, prevailed upon them to try the chance of an engagement in the open field, he so animated them by his example, that, after a most obstinate dispute, he gained a complete victory, which indeed cost him dear, but put an end to that destructive war. All the Cantabrians fit to bear arms were cut in pieces; their castles and strong holds taken and rased; and their women, children, and old men, (none else being left alive), were obliged to abandon the mountainous places, and settle in the plain.

* See *Can-*
ing Lan-
guage.

* See *Agrip-*

CANTABRICA, in botany, a synonyme of a species of *CONVOLVULUS*.

CANTABRUM, in antiquity, a large kind of flag used by the Roman emperors, distinguished by its peculiar colour, and bearing on it some words or motto of good omen, to encourage the soldiers.

CANTACUZENUS (Johannes), of Constantinople, a celebrated statesman, general, and historian, was born in that city, of a very ancient and noble family. He was bred to letters and to arms, and admitted to the highest offices of the state. The emperor Andronicus loaded him with wealth and honour; made him generalissimo of his forces; and was desirous of having him join him in the government, but this he refused. Andronicus dying in 1341, left to Cantacuzenus the care of the empire, till his son John Palologus, who was then but nine years of age, should be fit to take it upon himself. This trust he faithfully discharged; till the empress dowager and her faction forming a party against him, declared him a traitor. On this the principal nobility and the army besought him to ascend the throne; and accordingly he was crowned on the 21st of May, 1342. This was followed by a civil war, which lasted five years; when he admitted John a partner with him in the empire, and their union was confirmed by his giving him his daughter in marriage. Suspicions and enmities, however, soon arising, the war broke out again, and continued till John took Constantinople, in 1355. A few days after, Cantacuzenus, unwilling to continue the effusion of blood, abdicated his share of the empire, and retiring to a monastery, took the habit of a monk, and the name of *Josaphas*. His wife also retired to a nunnery, and changed her name of *Irene* for that of *Eugenia*. In this retirement he lived till the year 1411, when he was upwards of 100 years of age. Here he wrote a history of his own times, a Latin translation of which, from the Greek manuscript, was published by Pontanus at Ingolstadt, in 1603; and a splendid edition was printed at Paris, in 1645, in three volumes folio, of the original Greek, and Pontanus's Latin version. He also wrote an Apology for the Christian religion against that of Mahomet, under the name of *Christodulus*.

CANTALIVERS, in architecture, pieces of wood framed into the front or sides of a house, to suspend the mouldings and eyes over it.

CANTAR, or **CANTARO**, in commerce, a weight used in Italy, particularly in Leghorn, to weigh some sorts of merchandises.—There are three sorts of cantari, or quintals; one weighs 150 pounds, another 151, and the third 160: the first serves to weigh alum and cheese; the second is for sugar, and the third for wool and cod-fish.

CANTAR is also a measure of capacity used at Cochin, and containing four rubis.

CANTARINI (Simon), a famous painter, called the *Pesarese*, from his being born at Pesaro, was the disciple of Guido; and copied the manner of his master so happily, that it is often difficult to distinguish between their works. He died at Verona in 1648.

CANTATA, in music, a song or composition, intermixed with recitatives, airs, and different movements, chiefly intended for a single voice, with a thorough base, though sometimes for other instruments.

The cantata, when performed with judgment, has something in it very agreeable; the variety of the movement not clogging the ear, like other compositions. It was first used in Italy, then in France, whence it passed to us.

CANTAZARO, an episcopal city of Italy, in the kingdom of Naples, and in the territory of Calabria Ulterior. It is the residence of the governor of the province, and is seated near the sea, in E. Long. 17. 0. N. Lat. 38. 50.

CANTECROIX, a small territory of the Netherlands, in Brabant, and in the quarter of Antwerp, with the title of a principality; there is a small town of the same name, but Lirc is the capital.

CANTEMIR (Demetrius), son of a prince of Moldavia. Disappointed by not succeeding his father in that dignity, held under the Ottoman Port, he went over with his army to the Czar Peter the great, against whom he had been sent by the Grand Signior: he signalized himself in the Czar's service; and in the republic of letters, by a Latin history of the origin and decline of the Ottoman empire, &c. Died in 1723.

CANTEMIR (Antiochus), esteemed the founder of the Russian poetry, was the youngest son of the preceding. Under the most ingenious professors, whom the czar had invited to Petersburg, he learned mathematics, physics, history, moral philosophy, and polite literature; without neglecting the study of the Holy Scriptures, to which he had a great inclination. Scarce had he finished his academic course, when he printed a Concordance to the Psalms in the Russian language, and was elected member of the academy. The affairs of state, in which he was soon after engaged, did not make him neglect his literary pursuits. In order to make himself useful to his fellow-citizens, he composed his satires, to ridicule certain prejudices which had got footing among them. When but 23 years of age, he was nominated minister at the court of Great Britain; and his dexterity in the management of public affairs was as much admired, as his taste for the sciences. He had the same reputation in France, whither he went in 1738, in quality of minister plenipotentiary, and soon after was invested with the character of ambassador extraordinary. The wife and prudent manner in which he conducted himself during the different revolutions which happened in Russia during his absence, gained him the confidence and esteem of three successful princes. He died of a dropy, at Paris, in 1744, aged 44. Besides the pieces already mentioned, he wrote, 1. Some fables and odes. 2. A translation of Horace's epistles into Russian verse. 3. A prose translation of Fontenelle's plurality of worlds; and, 4. Algarotti's dialogues on light. The abbe Guasco has written his life in French, and translated his satires into that language.

CANTERBURY, a city of England, and capital of the county of Kent, situated in E. Long. 1. 15. N. Lat. 51. 16. It had the names of *Durovernum* and *Durobernium* given it by the Romans, and *Durobernia* by Bede, which are thought to be derived from *Durnubem*, signifying a rapid stream, such as the Stour, on which it stands, is. The Britons called it *Caer-Kent*, i. e. the city of Kent; and its present English name is of the same import, derived from the Saxon. Modern writers in Latin call it *Cantuarina*. Its great antiquity appears not only from Antoninus's itinerary, but from

Canthbury, from the military way which has been discovered here, and the causeways leading to Dover and Lymme, besides the coins and other curiosities found about it. The archiepiscopal and metropolitical dignity seems to have been settled here very early, about the beginning of the ninth century, if not sooner; and to prevent its being removed, an anathema was decreed against any who should attempt. After that, the city flourished greatly; though it suffered in common with other towns during the Danish invasions, and at other times by the casualties of fire. The city was given intirely to the bishops by William Rufus, and was held in the utmost veneration in the Popish times, especially after the murder of Becket in the reign of Henry II. to whose shrine so great was the resort, and so rich were the offerings, that Erasmus, who was an eye-witness of its wealth, says the whole church and chapel in which he was interred glittered with jewels; and at the dissolution, the plate and jewels filled two great chests, each of which required eight strong men to carry out. The cathedral was granted by Ethelbert, king of Kent, upon his conversion, to Austin the monk, together with his palace, and the royalty of the city and its territories. This Austin founded a monastery for monks, called from him *Augustin*. After the cathedral had been several times destroyed by fire and rebuilt, the present was begun about the year 1174, and augmented and embellished by the succeeding archbishops, till it was completed in the reign of Henry V. It is a noble Gothic pile, and before the reformation had 37 altars. A great many kings, princes, cardinals, and archbishops, are buried in it. At the dissolution, Henry VIII. seized all the revenues both of the church and monastery, except what he allotted for the maintenance of a dean, 12 prebendaries, and six preachers, whom he established in place of the monks. Besides the cathedral and other churches, as well as a monastery, the city had anciently a castle on the south-side, and strong walls, with towers, a ditch, and rampart; it had also a mint and an exchange. As to its government, it seems to have been entirely subject to the archbishop, both in spirituals and temporals; at least from the time that William Rufus gave it solely to bishop Anselm, till the reformation. It is now a county of itself; and the corporation consists of a mayor, recorder, 12 aldermen, a sheriff, 24 common-council-men, a mace-bearer, sword-bearer, and 20 or serjeants at mace. Every Monday a court is held at Guildhall for civil and criminal causes; and every other Tuesday for the government of the city. With respect to its present condition, here are at present no less than 2000 or 3000 French Protestants employed in the silk manufacture. Besides the cathedral, it contains 15 parish-churches, seven hospitals, a free-school, a house of correction, a gaol for criminals, and a sumptuous conduit for supplying the inhabitants with water. It consists of four streets, disposed in the form of a cross, and divided into six wards, which are about three miles in circumference. It is surrounded on all hands with hop-grounds much to its advantage, and is famed for its excellent brawn.

CANTERBURY-Bell, in botany, the English name of a species of *CAMPANULA*.

CANTERUS (William), an eminent linguist and philologist, was born at Utrecht, in 1542. He studied

at Louvain and Paris; and gave surprising proofs of his progress in Greek and Latin literature. He afterwards visited the several universities of Germany and Italy; and died at Louvain, in 1575, aged 33. He understood six languages, besides that of his native country; and, notwithstanding his dying so young, wrote several philological and critical works, among which are, *Notæ, Scholia, Emendationes, et Explicationes, in Euripidem, Sophoclem, Æschylum, Ciceronem, Propertium, Ausonium, &c.* and many translations of Greek authors.

CANTHARIDES. See CANTHARIS and MELOE.

CANTHARIS, in zoology, a genus of insects belonging to the order of insecta coleoptera. The feelers of this genus are fetaceous; the breast is margined, and shorter than the head; the elytra, or wing-cases, are flexible; and the sides of the belly are plated and papillous. Linnæus enumerates 27 species of the cantharis, most of them to be found in different parts of Europe. The cantharis used in making blistering plaisters, is ranked under a different genus, viz. the MELOE.

CANTHI, in anatomy, cavities at the extremities of the eye-lids, commonly called the *corners of the eye*: the greater of them, or the greater canthus, is next the nose; the lesser of them, or the little canthus, lies towards the temple.

CANTICLES, a canonical book of the Old Testament, otherwise called the *Song of Solomon*; by the Jews the *Song of songs, Canticum canticorum*. The book of Canticles is usually supposed to be an epithalamium composed by Solomon, on occasion of his marriage with the king of Egypt's daughter. But those who penetrate further into the mystery, find in it the marriage of Jesus Christ with human nature, the church, and good men. On this principle the Canticles is held to be a continued allegory, wherein, under the terms of a common wedding, a divine and spiritual marriage is expressed. This song contains the adventures of seven days and seven nights; the exact time allowed for the celebration of marriage among the Hebrews. The Jews themselves, apprehending the book liable to be understood in a gross and carnal manner, prudently prohibited the reading of it before the age of 30, and the same usage anciently obtained in the Christian church. Among the ancients, Theodore Mopsuetanus rejected the book of Canticles as not divine. Divers rabbins have also questioned its being written by inspiration. The Anabaptists generally lay it aside as a dangerous composition. It is alleged, that the name of God is not once found in it. Mr Whiston has a discourse expressly to prove, that the Canticles is not a sacred book of the Old Testament. He alleges it indeed to have been written by king Solomon the son of David; but asserts that it was composed at the time when that prince, blinded by his concubines, was sunk in lust and idolatry. This he chiefly infers from the general character of vanity and dissoluteness which reigns thro' the Canticles; in which there is not, according to Whiston, one thought that leads the mind towards religion, but all is worldly and carnal, to say no worse. For the mystic sense, he asserts it to be without foundation; and that the book is not cited as canonical by any writer before the destruction of Jerusalem. Mr Whiston will have it to have been taken into the canon between the years 77 and 128, when allegories came into vogue, and

and the rabbins began to corrupt the text of Scripture. Grotius, Nierembergius, the Dutch divines who criticised F. Simon, Menetrier, Bafnage, and some others, seem also to take the Canticles for a profane composition, on a footing with the love-pieces of Catullus or Ovid. But this opinion is refuted by Michaelis, Majus, Witfius, Nat. Alexander, Outrein, Francius, and others. Mr Whiffon's arguments have been particularly considered by Itchenor. R. Akiba finds the book of Canticles more divine than the rest: the whole world, according to this rabbin, is not worth that day when the Canticles was given to Israel; for, whereas all the hagiographers are holy, the Canticles is the holy of holies.

CANTIN (Cape), a promontory of the coast of Morocco in Africa, situated in W. Long. 10. 2. N. Lat. 33. 9.

CANTING, a sea-phrase, denotes the act of turning any thing about.

CANTING *Language or dialect*, is a mysterious sort of jargon used by gypsies, thieves, and strolling beggars, to express their sentiments to each other, without being understood by the rest of mankind. This dialect is not founded on any rules: yet, even out of that irregularity, many words seem to retain something of scholarship; as *togeman* a gown, from *toga* in the Latin; *pannam*, bread, from *panis*; *casan*, cheese, from *caseus*, &c. It is observable, that, even unknown to ourselves, we have adopted some of their turns into our vulgar language; as *bite and bilk*, to cheat; *bounce*, to vapour; *bowse*, strong drink; *fitch*, to steal; *flog*, to whip; *rig*, game or ridicule; *roaf*, to rally; *rhino*, money. From the same source proceed the words *sham*, *banter*, *bubble*, *bully*, *sharpers*, *cutting*, *shuffling*, *palming*, &c. An anonymous author has given a canting dictionary, comprehending all the terms used by the several tribes of gypsies, beggars, shoplifters, highwaymen, footpads, and other clans of cheats and villains, with a collection of songs in the canting dialect; London, 1725, 8vo.

CANTIUM, (anc. geog.) a promontory of Britain, literally denoting a head-land, giving name to a territory called *Cantium*, now *Kent*. The promontory is now called the *North Foreland*.

CANTO denotes a part or division of a poem, answering to what is otherwise called a *book*. The word is Italian, where it properly signifies *song*. Tasso, Ariosto, and several other Italians, have divided their longer or heroic poems into cantos. In imitation of them, Scarron has also divided his *Gigantomachia*, and Boileau his *Lutrin*, into chants or songs. The like usage has been adopted by some English writers, as Butler, who divides his *Hudibras*, and Dr Garth his *Dispensary*, into cantos. A late translator of part of Virgil's *Æneid* has even subdivided a book of Virgil into several cantos.

CANTO, in the Italian music, signifies a *song*: hence *canto semplice* is where all the notes or figures are equal, and called also *canto fermo*; *canto figurato*, that where the figures are unequal, and express different motions.

CANTO also signifies the treble part of a song: hence *canto concertante*, the treble of the little chorus; *canto ripieno*, the treble of the grand chorus, or that which sings only now and then in particular places. *Canto* signifies the first treble, unless some other word be

added to it, as *secondo*, in which case it denotes the second treble.

CANTON, in geography, denotes a small district or country constituting a distinct government: such are the cantons of Switzerland.

CANTON, or *Quang-tong*, a province of the empire of China in Asia. It is bounded on the north by Kyang-fi; on the north-east, by Fokeyn; on the west, by Quang-fi and the kingdom of Tonquin; and the rest is washed by Nan-hay, or the sea of the south. This province is reckoned the most considerable in China, not only on account of its extent, but also because of its vast commerce, opulence, advantageous situation, and great number of its ports. Its inhabitants are computed to amount to 383,360 families, or 1,998,029 men. The soil is so fertile, that it produces two crops of corn yearly; and in the like plenty all sorts of grain, fruits, and vegetables, with every thing that can contribute to the pleasures of life. The climate is warm, but clear; and the people are stout and healthy. The commodities of this province are of the most valuable kind; such as diamonds, and precious stones of all sorts; pearls, gold, silver, and other metals, curiously wrought for various uses. Silks, cottons, and linens of all kinds, are also manufactured and exported in great quantities, as well as china-ware and japan-work; in which such multitudes are employed, that, notwithstanding the fertility of the province, it doth not produce a sufficient quantity of provisions for its inhabitants, but is assisted by some of the neighbouring ones. They use here the same way of hatching eggs in ovens and dunghills that they do in Egypt. The eggs of ducks, which are in great plenty, are particularly used in this manner: they have also a method of preserving them fresh all the year round by covering them with a sort of paste. We are told of a curious singularity of the ducks and chickens so hatched; viz. that the owners carry them in boats to the sea-side, at low water, where they feed on such insects as they can find; but though the doves are thus naturally intermixed, no sooner does the owner strike on a balon, as a signal to return, than each dove returns to its own boat, as pigeons do to their holes. The governor or viceroy of Canton is also governor of Quang-fi; for which reason he commonly resides at Chau-king, to communicate his orders to both provinces with the greater facility. He keeps a great number of soldiers, to suppress highwaymen and pirates, which are very troublesome. For the same end there are a great number of fortresses both on the sea-coasts and inland, most of them like large cities, very strong, and well garrisoned, besides inferior ones dispersed in proper places. This province is divided into ten capital jurisdictions; Canton or Quanchew the chief, Shauchew, Nan-yong, Whechow, Chau-chew, Chau-king, Kau-chew, Lyen-chew, Lwy-chew, and Kyun-chew; which last is the capital of the island of Haynan.

CANTON, a large, populous, and wealthy maritime city of China, capital of the province of that name. It is seated on the mouth of the river *Ta-ho* or great river, which is here very wide and spacious, and forms the bay called *Humen*, or tyger's gate, though it hath nothing terrible in it except a few forts built to keep off the pirates. The city is very large; being reckoned, with its suburbs, upwards of 20 miles in compass. It

Cantoning
↓
Canute.

Canute.

may be properly said to consist of three cities, each of them surrounded with strong and lofty walls, yet so as to have a communication with each other by stately gates, which are only shut up at night. The streets are long and straight, paved with flag-stones, and adorned with several triumphal arches. There are also bazars or covered market-places full of shops. The houses are only a ground-floor built with earth, and covered with tiles; however, the shops give it a very neat look. The better sort of people are carried about in chairs; but the common people walk bare-footed and bare-headed; and their goods are carried by porters, for they have no waggons. At the end of every street is a barrier which is shut in the evening, as well as the gates of the city, so that people are obliged to be at home early. The number of inhabitants is computed at 1,000,000. E. Long. 112. 27. N. Lat. 25. 20.

CANTONING, in the military art, is the allotting distinct and separate quarters to each regiment; the town where they are quartered being divided into as many cantons as there are regiments.

CANTRED, or CANTREE, signifies an hundred villages. It is a British word, compounded of the adjective *cant*, i. e. hundred; and *tres*, a town or village. In Wales some of the counties are divided into cantreds, as in England into hundreds.

CANTYRE. See KINTYRE.

CANTZ, a town of Silesia in Germany. E. Long. 16. 36. N. Lat. 51. 6.

CANVAS, in commerce, a very clear unbleached cloth of hemp, or flax, wove regularly in little squares. It is used for working tapestry with the needle, by passing the threads of gold, silver, silk, or wool, through the intervals or squares.

CANVAS is also a coarse cloth of hemp, unbleached, somewhat clear, which serves to cover womens stays, also to stiffen mens clothes, and to make some other of their wearing-apparel, &c.

CANVAS is used among the French for the model and first words, where an air or piece of music is composed, and given to a poet to regulate and finish.

CANVAS is also a name sometimes given to sail-cloth.

CANVAS, among painters, is the cloth on which they usually draw their pictures; the canvas being smoothed over with a slick-stone, then sized, and afterwards whited over, makes what the painters call their *primed cloth*, on which they draw their first sketches with coal or chalk, and afterwards finish with colours.

CANUTE, the first Danish king of England after Ironside. He married Emma widow of king Ethelred; and put to death several persons of quality who stood in his way to the crown. Having thus settled his power in England, he made a voyage to his other kingdom of Denmark, in order to resist the attacks of the king of Sweden; and he carried along with him a great body of the English under the command of the earl of Godwin. This nobleman had here an opportunity of performing a service by which he both reconciled the king's mind to the English nation, and, gaining to himself the friendship of his sovereign, laid the foundation of that immense fortune which he acquired to his family. He was stationed next the Swedish camp; and, observing a favourable opportunity which he was obliged suddenly to seize, he attacked the enemy in the

night, drove them suddenly from their trenches, threw them into disorder, pursued his advantage, and obtained a decisive victory over them. Next morning, Canute, seeing the English camp entirely abandoned, imagined that these disaffected troops had deserted to the enemy; and he was agreeably surprised to find that they were at that time engaged in pursuit of the discomfited Swedes. He was so pleased with this success, and the manner of obtaining it, that he bestowed his daughter in marriage upon Godwin, and treated him ever after with the most entire confidence and regard.

In another voyage which he afterwards made to Denmark, Canute attacked Norway, and expelled the just but unwarlike Olaus from his kingdom, of which he kept possession till the death of that prince. He had now by his conquests and valour attained the utmost height of his ambition; and having leisure from wars and intrigues, he felt the unsatisfactory nature of all human enjoyments; and, equally weary of the glory and turmoils of this life, he began to cast his view towards that future existence which it is so natural for the human mind, whether satiated by prosperity or disgusted with adversity, to make the object of its attention. Unfortunately the spirit which prevailed in that age gave a wrong direction to his devotion; and, instead of making atonement to those whom he had formerly injured by his acts of violence, he entirely employed himself in those exercises of piety which the monks represented as most meritorious. He built churches; he endowed monasteries; he enriched ecclesiastics; and he bestowed revenues for the support of chantries at Apsington and other places, where he appointed prayers to be said for the souls of those who had there fallen in battle against him. He even undertook a pilgrimage to Rome, where he sojourned a considerable time; and, besides obtaining from the Pope some privileges for the English school erected there, he engaged all the princes through whose dominions he was obliged to pass, to desist from those heavy impositions and tolls which they were accustomed to exact from the English pilgrims. By this spirit of devotion, no less than by his equitable and politic administration, he gained in a good measure the affections of his subjects.

Canute, who was the greatest and most powerful prince of his time, sovereign of Denmark and Norway as well as of England, could not fail to meet with adulation from his courtiers; a tribute which is liberally paid even to the meanest and weakest of princes. Some of his flatterers breaking out one day in admiration of his grandeur, exclaimed, that every thing was possible for him: upon which, the monarch, it is said, ordered his chair to be set on the sea-shore while the tide was making; and, as the waters approached, he commanded them to retire, and to obey the voice of him who was lord of the ocean. He feigned to sit some time in expectation of their submission; but when the sea still advanced towards him, and began to wash him with its billows, he turned to his courtiers, and remarked to them, That every creature in the universe was feeble and impotent, and that power resided with one Being alone, in whose hands were all the elements of nature, who could say to the ocean, "Thus far shalt thou go, and no farther," and who could level with his nod the most towering piles of human pride and ambition. From that time, it is said, he never would wear a crown.

He

Canzone
 Caoutchouc.

He died in the 20th year of his reign; and was interred at Winchester, in the old monastery.

CANZONE, in music, signifies, in general, a song where some little fugues are introduced: but it is sometimes used for a sort of Italian poem, usually pretty long, to which music may be composed in the style of a cantata. If this term be added to a piece of instrumental music, it signifies much the same as cantata: if placed in any part of a sonata, it implies the same meaning as *allegro*, and only denotes that the part to which it is prefixed is to be played or sung in a brisk and lively manner.

CANZONETTA, a diminutive of canzone, denoting a little short song. The canzonette neapolitane has two strains, each whereof is sung twice over, as the vaudevilles of the French: the canzonette siciliane is a species of jig, the measure whereof is usually twelve eighths, and six eighths, and sometimes both, as rondeaux.

CAORLO, a small island in the gulf of Venice, on the coast of Friuli, 20 miles south-west of Aquileia, subject to Venice. It has a town of the same name, with a bishop's see.

CAOUTCHOUC, or ΚΑΟΥΤΧΟΥΚ, a resin found in different parts of Asia and South America, and possessed of the most singular properties. No substance is yet known which is so pliable, and at the same time so elastic; and it is farther a matter of curiosity as being capable of resisting the action of very powerful menstrua. From the account of M. de la Condaminé, we learn, that this substance oozes out, under the form of a vegetable milk, from incisions made in a certain species of tree in the country in which it is found. This liquor gradually dries, and is formed into a substance of the appearance of leather, which is in a very high degree pliable and elastic, while at the same time it possesses a considerable degree of solidity. On account of these properties, the Omaguas, a numerous nation on the banks of the river of the Amazons, employ this resin, while yet in the state of milk, for making several utensils, as goblets, bottles, and the like. As the same properties would render it of singular utility for many other purposes in arts, philosophers have long endeavoured to discover some method of dissolving it in such a manner, that it would assume different figures with equal ease as when in its original state of milk. In the memoirs of the academy of Sciences for 1768 we have an account of several attempts for this purpose, and how it may be effected.—The state of vegetable milk in which the caoutchouc resin is found when it comes from the tree, led Mr Macquer to imagine that it was composed of an oil and a watery matter. From its wanting aromatic flavour, from its little volatility, and from its being incapable of solution in spirit of wine, he concluded that the oil which entered its composition was not an essential, but a fatty, one. Hence he thought it probable that it passed from a fluid to a solid form by the evaporation of the watery part, and that the oily solvents would reduce it to a soft state. The first trials he made for dissolving it were with linseed oil, essence of turpentine, and several others. But all he could obtain by means of these menstrua was a viscid substance incapable of being hardened, and totally void of elasticity. The rectified essential oil of turpentine was employed seemingly with greater success. To separate from

Caoutchouc.
 Cap.

this menstruum the caoutchouc which it had dissolved, Mr Macquer added spirit of wine: but the consequence was, that part only of the oil united with the spirit; the rest remaining obstinately attached to the resin which it had dissolved, and thus preventing it from assuming a solid consistence. The author next endeavoured to dissolve it by means of heat in Papin's digester. But neither water, nor spirit of wine, although in this way capable of dissolving the hardest bones, could produce any other effect upon it than to render it more firm than before. After this, he tried what effect the milky juice of other vegetables would have upon it. He used several kinds, particularly that of the fig. But, in this way, he could obtain no solution. From the great volatility of ether, he was next induced to try it as a menstruum; and, for this purpose, he prepared some with great attention. The caoutchouc, cut into little bits, and put into a proper vessel with as much ether as was sufficient to cover it, was perfectly dissolved without any other heat than that of the atmosphere. This solution was transparent, and of an amber colour. It still preserved the smell of ether, but mixed with the disagreeable odour of the caoutchouc, and it was a little less fluid than pure ether. Upon its being thrown into water, no milky liquor was produced; but there arose to the surface a solid membrane which possessed the great elasticity and other peculiar properties of the caoutchouc.

The Indian method of forming bottles, goblets, &c. of the caoutchouc is, by making moulds of clay, which they cover with thin layers of the caoutchouc, taking care never to lay on a fresh one till the former is dry. After it has acquired the proper thickness, by an instrument fitted for that purpose, they take out the clay. The same process may be followed in forming vessels of the caoutchouc dissolved in ether. But in forming small vessels, Mr Macquer did not employ moulds made of clay, but of wax, which were easily removed, by throwing the vessel after it was formed into boiling water.

Of this gum, it is said, the Chinese make elastic rings for lascivious purposes.—Among us, it is used by surgeons for injecting liquids, and by painters for rubbing out black-lead pencil marks.

CAP, a part of dress made to cover the head, much in the figure thereof.

The use of caps and hats is referred to the year 1449, the first seen in these parts of the world being at the entry of Charles VII. into Rouen: from that time they began to take place of the hoods, or chaperons, that had been used till then. When the cap was of velvet, they called it *mortier*; when of wool, simply *bonnet*. None but kings, princes, and knights, were allowed the use of the mortar. The cap was the head-dress of the clergy and graduates: Churchmen and members of universities, students in law, physic, &c. as well as graduates, wear square caps in most universities. Doctors are distinguished by peculiar caps, given them in assuming the doctorate. Pasquier says, that the giving the cap to students in the universities, was to denote that they had acquired full liberty, and were no longer subject to the rod of their superiors, in imitation of the ancient Romans, who gave a pilus or cap to their slaves, in the ceremony of making them free. The cap is also used as a mark

Cap
Caperolans.

of infamy in Italy. The Jews are distinguished by a yellow cap at Lucca, and by an orange one in France.

CAP of Maintenance, one of the regalia, or ornaments of state belonging to the kings of England, before whom it was carried at the coronation and other great solemnities. Caps of maintenance are also carried before the mayors of the several cities in England.

CAP, in ship-building, a strong, thick, block of wood, used to confine two masts together, when one is erected at the head of the other in order to lengthen it. It is for this purpose furnished with two holes perpendicular to its length and breadth, and parallel to its thickness: one of these is square, and the other round; the former being solidly fixed upon the upper end of the lower mast, whilst the latter receives the mast employed to lengthen it, and secures it in this position.

CAPACIO, an episcopal town of Italy, in the kingdom of Naples, and in the hither Principato. E. Long. 15. 18. N. Lat. 40. 40.

CAPACITY, in a general sense, an aptitude or disposition to hold or retain any thing.

CAPACITY, in geometry, is the solid contents of any body; also our hollow measure for wine, beer, corn, salt, &c. are called *measures of capacity*.

CAPACITY, in law, the ability of a man, or body politic, to give or take lands or other things, or sue actions.

Our law allows the king two capacities; a natural, and a political: in the first, he may purchase lands to him and his heirs; in the second, to him and his successors. The clergy of the church of England have the like.

CAPE, in geography, an high land running out with a point, into the sea, as Cape-Nord, Cape-Horn, the Cape of Good-Hope, &c.

CAPE Breton. See BRETON.

CAPE Coast Castle. See COAST.

CAPE of Good-Hope. See GOOD-HOPE.

CAPE Verd. See VERD.

CAPELLA, in astronomy, a bright fixed star in the left shoulder of the constellation auriga.

CAPELLAS (Lewis), an eminent French Protestant divine, born at Sedan in Champagne about the year 1579. He was author of some learned works; but is chiefly known from the controversy he engaged in with the younger Buxtorf concerning the antiquity of Hebrew points, which Capellas undertook to disprove. His *Critica Sacra* was also an elaborate work, and excited some disputes: he died in 1658, having made an abridgement of his life in his work *De gente Capellori*.

CAPELLE, a town of France, in Picardy, and in the Tierache, eight miles from Guise. It was taken by the Spaniards in 1636; but retaken the year after. E. Long. 3. 59. N. Lat. 49. 58.

CAPELLETS, in farristry. See there, § xxxvi. 4.

CAPER, in botany. See CAPPARIS.

CAPEROLANS, a congregation of religious in Italy, so called from Peter Caperole their founder, in the 15th century.

The Milanese and Venetians being at war, the enmity occasioned thereby spread itself to the very cloysters. The superiors of the province of Milan, of minor brothers, which extended itself as far as the territories of the republic of Venice, carried it so haugh-

tily over the Venetians, that those of the convent of Brescia resolved to shake off a yoke which was grown insupportable to them. The superiors, informed of this, expelled out of the province those whom they considered as the authors of this design; the principal of whom were Peter Caperole, Mathew de Tharvillo, and Bonaventure of Brescia. Peter Caperole, a man of an enterprising genius, found means to separate the convents of Brescia, Bergamo, and Cremona, from the province of Milan, and subject them to the conventuals.

This occasioned a law-suit between the vicar-general and these convents, which was determined in favour of the latter; and these convents, in 1475, by the authority of Pope Sixtus IV. were erected into a distinct vicariate, under the title of that of *Brescia*. This not satisfying the ambition of Caperole, he obtained, by the interposition of the Doge of Venice, that this vicariate might be erected into a congregation, which was called from him *Caperolans*. This congregation still subsists in Italy, and is composed of 24 convents, situated in Brescia, Bergamo, and Cremona.

CAPERQUIN, a town of Ireland, in the county of Waterford, and province of Munster, situated on the river Blackwater. W. Long. 7. 50. N. Lat. 52. 5.

CAPESTAN, a town of France, in Lower Languedoc, in the diocese of Narbonne, and near the royal canal. E. Long. 3. 5. N. Lat. 43. 35.

CAPHAR, a duty which the Turks raise on the Christians, who carry or send merchandises from Aleppo to Jerusalem and other places in Syria.

This duty of caphar was first imposed by the Christians themselves, when they were in possession of the Holy Land, for the maintenance of the troops which were planted in difficult passes to observe the Arabs and prevent their incursions. It is still continued, and much increased by the Turks, under pretence of defending the Christians against the Arabs; with whom, nevertheless, they keep a secret intelligence, favouring their excursions and plunders.

CAP-AGA, or *CAPOU-Agassi*, a Turkish officer, who is, as it were, grand master of the seraglio. He is the first in dignity and repute of all the white eunuchs, and is always near the Grand Signior's person. It is he who introduces ambassadors to audience, and all the great affairs pass through his hand before they come to that of the prince.

CAPIAS, in law, a writ of two sorts; one before judgment in an action, and the other after. That before judgment is called *capias ad respondendum*, where an original is issued out, to take the defendant, and make him answer the plaintiff. That after judgment is of divers kinds; as,

CAPIAS ad Satisfaciendum, a writ of execution that issues on a judgment obtained, and lies where any person recovers in a personal action, as for debt, damages, &c. in which cases this writ issues to the sheriff commanding him to take the body of him against whom the debt is recovered, who is to be kept in prison till he make satisfaction.

CAPIAS pro Fine is a writ lying where a person is fined to the king, for some offence committed against a statute, and he does not discharge the fine according to the judgment; therefore his body shall be taken by this writ, and committed to goal till the fine is paid.

CAPIAS Ullegatum, a writ which lies against any one out-

Caperquin
Capias.

Capias
Capillary.

outlawed, upon any action personal or criminal, by which the sheriff is ordered to apprehend the party outlawed, for not appearing on the exigent, and keep him in safe custody till the day of return, when he is ordered to present him to the court, to be there farther ordered for his contempt.

CAPIAS in Withernam, a writ that lies for cattle in *withernam*: that is, where a distrefs taken is driven out of the county, so that the sheriff cannot make deliverance upon a replevin; then this writ issues, commanding the sheriff to take as many beasts of the distraiter, &c.

CAPIGI, in the Turkish affairs, the name of certain inferior officers belonging to the seraglio, to the number of 500, whose business it is to assist the janizaries in guarding the first and second gate of that palace; whence also the name *Capigi*, which signifies a gate.

CAPILLAMENT, in a general sense, signifies a hair; when the word is applied to several things, which on account of their length or their fineness resemble hairs: as,

CAPILLMENTS of the Nerve, in anatomy, the fine fibres or filaments whereof the nerves are composed.

CAPILLARY, in a general sense, an appellation given to things on account of their extreme fineness, or resembling hair.

CAPILLARY Tubes, in physics, are small pipes of glass, whose canals are extremely narrow, their diameter being only a half, a third, or a fourth of a line.

The ascent of water, &c. in capillary tubes, is a phenomenon that has long embarrassed the philosophers: for let one end of a glass tube open at both extremities, be immersed in water, the liquor within the tube will rise to a considerable height above the external surface: or if two or more tubes are immersed in the same fluid, one a capillary tube, and the other of a larger bore, the fluid will ascend higher in the former than in the latter; and this will be in a reciprocal ratio of the diameters of the tubes.

In order to account for this phenomenon, it will be necessary first to premise, that the attraction between the particles of glass and water is greater than the attraction between the particles of water themselves: for if a glass tube be placed in a position parallel to the horizon, and a drop of water be applied to the under side of the tube, it will adhere to it; nor will it fall from the glass till its bulk and gravity are so far increased, as to overcome the attraction of the glass. Hence it is easy to conceive how sensibly such a power must act on the surface of a fluid, not viscid, as water, contained within the small cavity or bore of a glass-tube; as also that it will be proportionably stronger as the diameter of the bore is smaller; for it will be evident that the efficacy of the power is in the inverse proportion of the diameter, when it is considered, that such particles only as are in contact with the fluid, and those immediately above the surface, can effect it.

Now these particles form a periphery contiguous to the surface, the upper part of which attracts and raises the surface, while the lower part, which is in contact with it, supports it: so that neither the thickness nor length of the tube is of any consequence here; the periphery of particles only, which is always proportionable to the diameter of the bore, is the only acting power. The quantity of the fluid raised will therefore be as the

surface of the bore which it fills, that is, as the diameter; for otherwise the effect would not be proportional to the cause, since the quantities are always as the ratio of the diameters; the heights therefore to which the fluids will rise, in different tubes, will be inversely as the diameters.

Some doubt whether the law holds throughout, of the ascent of the fluid being always higher as the tube is smaller; Dr Hook's experiments, with tubes almost as fine as cobwebs, seem to shew the contrary. The water in these, he observes, did not rise so high as one would have expected. The highest he ever found it, was at 21 inches above the level of the water in the basin; which is much short of what it ought to have been by the law abovementioned. See *COHESION*.

CAPILLARY Vessels. Many small vessels of animal bodies have been discovered by the modern invention of injecting the vessels of animals with a colouring fluid which upon cooling grows hard. But though most anatomists know the manner of filling the large trunks, few are acquainted with the art of filling the capillaries. Dr Monro has given what he after many trials has found most successful *. See *INJECTION*.

CAPILLUS VENERIS. See *ADIANTHUM*.

CAPILUPI, or *CAPILUPUS*, (*Camillus*), a native of Mantua in the 16th century. He wrote a book intitled *The Stratagem*; in which he relates not only what was perpetrated at Paris during the massacre on St Bartholomew's day, but also the artful preparations which preceded that horrid massacre. It is, however, blended with a great number of futilities.

CAPILUPI (*Lælius*), an Italian poet brother to the former, made himself famous by some Centos of Virgil. The manner in which he applied Virgil's expressions to represent things which the poet never dreamt of, is admired. His Cento against women is very ingenious, but too fatirical. The poems of Capilupi are inserted in the *Delicie Poetarum Italorum*.

CAPITA, (distribution by), in law, signifies the appointing to every man an equal share of a personal estate; when all the claimants claim in their own rights, as in equal degrees of kindred, and not *jure representationis*.

CAPITA, (succession by), where the claimants are next in degree to the ancestor, in their own right, and not by right of representation.

CAPITAL, of the Latin *caput* "the head", is used on various occasions, to express the relation of a head, chief, or principal: thus,

CAPITAL City, in geography, denotes the principal city of a kingdom, state, or province.

CAPITAL Stock, among merchants, bankers, and traders, signifies the sum of money which individuals bring to make up the common stock of a partnership when it is first formed. It is also said of the stock which a merchant at first puts into trade for his account. It likewise signifies the fund of a trading company or corporation, in which sense the word stock is generally added to it. Thus we say, the capital stock of the bank, &c. The word capital is opposed to that of profit or gain, though the profit often increases the capital, and becomes of itself part of the capital, when joined with the former.

CAPITAL Crime, such a one as subjects the criminal to capital punishment, that is, to loss of life *. See *CRIME* and *Punishment*.

CAPIT-

Capillary
Capital.

* Medical
Floys,
Vol. 1.

Capital
Capitol.

Capitol
Capitoul.

CAPITAL Picture, in painting, denotes one of the finest and most excellent pieces of any celebrated master.

CAPITAL Letters, in printing, large or initial letters, wherein titles, &c. are composed; with which all periods, verses, &c. commence; and wherewith also all proper names of men, kingdoms, nations, &c. begin. The practice which, for some time, obtained among our printers, of beginning every substantive with a capital, is now justly fallen into disrepute; being a manifest perversion of the design of capitals, as well as an offence against beauty and distinctness.

CAPITAL, in architecture, the uppermost part of a column or pilaster, serving as the head or crowning, and placed immediately over the shaft, and under the entablature. See **ARCHITECTURE**.

CAPITANATA, one of the 12 provinces of the kingdom of Naples, in Italy, bounded on the north by the Gulph of Venice, on the east by the Terra di Bari, on the south by the Basilicata and the Farther Principato, and on the west by the county di Molise and a small part of Hither Abruzzo. It is a level country, without trees; the soil sandy, the air hot: the land, however, near the rivers, is fertile in pastures. The capital town is Manfredonia.

CAPITANIA, in geography, an appellation given to the 12 governments established by the Portuguese in the Brasils.

CAPITATION, a tax or imposition raised on each person, in proportion to his labour, industry, office, rank, &c. It is a very ancient kind of tribute. The Latins call it *tributum*, by which taxes on persons are distinguished from taxes on merchandise, which were called *vectigalia*.

Capitations are never practised among us but in exigencies of state. In France the capitation was introduced by Lewis XIV. in 1695; and is a tax very different from the *tailles*, being levied from all persons whether they be subject to the *taille* or not. The clergy pay no capitation, but the princes of the blood are not exempted from it.

CAPITE, in law, (from *caput*, i. e. *rex*; whence *tenere in capite*, is to hold of the king, the head or lord paramount of all the lands in the kingdom): An ancient tenure of land, held immediately of the king, as of his crown, either by knight's service, or by socage. It is now abolished. See **TENURE**.

CAPITE Censi, in antiquity, the lowest rank of Roman citizens, who in public taxes were rated the least of all, being such as never were worth above 365 asses. They were supposed to have been thus called, because they were rather counted and marshalled by their heads than by their estates. The *capite censi* made part of the sixth class of citizens, being below the *proletarii*, who formed the other moiety of that class. They were not enrolled in the army, as being judged not able to support the expence of war; for in those days the soldiers maintained themselves. It does not appear, that before Caius Marius any of the Roman generals lifted the *capite censi* in their armies.

CAPITOL, **CAPITOLIUM**, in antiquity, a famous fort or castle, on the Mons Capitolinus at Rome, wherein was a temple dedicated to Jupiter, thence also denominated *Capitolinus*, in which the senate anciently assembled; and which still serves as the city-hall, or town-house, for the meeting of the conservators of the

Roman people.—It had its name *capitol*, from *caput*, a man's head, said to have been found fresh, and yet bleeding, upon digging the foundation of the temple built in honour of Jupiter. Arnobius adds, that the man's name was *Tolus*, whence *caput-tolium*.—The first foundations of the capitol were laid by Tarquin the Elder, in the year of Rome 139. His successor Servius raised the walls; and Tarquin the Proud finished it, in the year 221. But it was not consecrated till the third year after the expulsion of the kings, and establishment of the consulate. The ceremony of the dedication of the temple was performed by the consul Horatius in 246.

The capitol consisted of three parts; a nave sacred to Jupiter; and two wings, the one consecrated to Juno, the other to Minerva: it was ascended to by stairs; the frontispice and sides were surrounded with galleries, in which those who were honoured with triumphs entertained the senate at a magnificent banquet, after the sacrifices had been offered to the gods.

Both the inside and outside were enriched with an infinity of ornaments, the most distinguished of which was the statue of Jupiter, with his golden thunderbolt, his sceptre, and crown. In the capitol also were a temple to Jupiter the guardian, and another to Juno, with the mint; and on the descent of the hill was the temple of Concord. This beautiful edifice contained the most sacred deposits of religion, such as the ancilia, the books of the Sibyls, &c.

The capitol was burnt under Vitellius, and rebuilt under Vespasian. It was burnt a second time by lightning under Titus, and restored by Domitian.

Anciently the name *capitol* was likewise applied to all the principal temples, in most of the colonies throughout the Roman empire; as at Constantinople, Jerusalem, Carthage, Ravenna, Capua, &c.—That of Thoulouse, has given the name of *capitoul* to its echevins or sheriffs.

CAPITOLINE GAMES, annual games instituted by Camillus, in honour of Jupiter Capitolinus, and in commemoration of the capitol's not being taken by the Gauls. Plutarch tells us, that a part of the ceremony consisted in the public criers putting up the Hetrurians to sale by auction: they also took an old man, and tying a golden bulla about his neck, exposed him to the public derision. Festus says they also dressed him in a pretexta.—There was another kind of Capitoline games, instituted by Domitian, wherein there were rewards and crowns bestowed on the poets, champions, orators, historians, and musicians. These last Capitoline games were celebrated every five years, and became so famous, that, instead of calculating time by lustra, they began to count by Capitoline games, as the Greeks did by Olympiads. It appears, however, that this custom was not of long continuance.

CAPITOLINUS (Julius), an historian in the beginning of the fourth age under Dioclesian, to whom he inscribed the Lives of Verus, Antoninus Pius, Claudius Balbinus, Macrinus, the Maximins, and the Gordians. He wrote other lives, which are most of them lost.

CAPITOUL, an appellation given to the chief magistrates of Thoulouse, on account of their meeting in a place called the *Capitol*. They are eight in number; are chosen annually; and have each the government of

Capitulation a capitulate, or precinct, like the wards of London.

CAPITULATION, in military affairs, a treaty made between the inhabitants or garrison of a place besieged, and the besiegers, for the delivering up the place on certain conditions.—The most honourable and ordinary terms of capitulation are, To march out at the breach with arms and baggage, drums beating, colours flying, a match lighted at both ends, and some pieces of cannon, waggons and convoys for their baggage and for their sick and wounded.

CAPITULATION, in the German polity, a contract which the emperor makes with the electors, in the name of all the princes and states in the empire, before he is declared emperor, and which he ratifies before he is raised to that sovereign dignity. The principal points which the emperor undertakes to observe are, 1. To defend the church and empire. 2. To observe the fundamental laws of the empire. And, 3. To maintain and preserve the rights, privileges, and immunities of the electors, princes, and other states of the empire, specified in the capitulation. These articles and capitulations are presented to the emperor by the electors only, without the concurrence of the other states, who have complained from time to time of such proceedings; and in the time of the Westphalian treaty, in 1648, it was proposed to deliberate in the following diet, upon a way of making a perpetual capitulation; but the electors have always found means of eluding the execution of this article. In order, however, to give some satisfaction to their adversaries, they have inserted in the capitulations of the emperors, and in that of Francis I. in particular, a promise to use all their influence to bring the affair of a perpetual capitulation to a conclusion. Some German authors own, that this capitulation limits the emperor's power; but maintain that it does not weaken his sovereignty: though the most part maintain that he is not absolute, because he receives the empire under conditions which sets bounds to an absolute authority.

CAPNOIDES, in botany, the trivial name of a species of *FUMARIA*.

CAPO FINO, a large barren rock in the territory of the Genoese, which has a castle on its eastern peak. Near it is a small harbour of the same name, 13 miles east by south of Genoa.

CAPO d' Istria, a considerable town of Italy, in Istria, on the gulph of Trieste, with a bishop's see, and subject to the Venetians. The air is wholesome and temperate; its principal revenue consists in wine and salt. E. Long. 14. o. N. Lat. 45. 48.

CAPON, a cock-chicken, gelded as soon as left by the dam, or as soon as he begins to crow. They are of use either to lead chickens, ducklings, pheasants, &c. and defend them from the kites and buzzards; or to feed on the table, they being reckoned more delicate than either a cock or a hen.

CAPONIERE, or **CAPONIERE**, in fortification, a covered lodgement, sunk four or five feet into the ground, encompassed with a little parapet about two feet high, serving to support several planks covered with earth. The caponiere is large enough to contain 15 or 20 soldiers; and is usually placed in the glacis on the extremity of the counterescarp, and in dry moats; having little embrasures for the soldiers to fire through.

CAPPADOCIA, an ancient kingdom of Asia,

comprehending all that country which lies between mount Taurus and the Euxine Sea. It was divided by the Persians into two satrapies or governments; by the Macedonians into two kingdoms, the one called *Cappadocia ad Taurum*; the other *Cappadocia ad Pontum*, and commonly *Pontus*; for the history, &c. of which last, see the article *PONTUS*.

CAPPADOCIA Magna, or *Cappadocia* properly so called, lies between the 38 and 41 degrees of north latitude. It was bounded by Pontus on the north, Lycania and part of Armenia Major on the south, Galatia on the west, and by Euphrates and part of Armenia Minor on the east. The first king of Cappadocia we read of in history was Pharnaces, who was preferred to the crown by Cyrus king of Persia, who gave him his sister Atossa in marriage. This is all we find recorded of him, except that he was killed in a war with the Hyrcanians. After him came a succession of eight kings, of whom we know scarce any thing but that they continued faithful to the Persian interest. In the time of Alexander the Great, Cappadocia was governed by Ariarathes II. who, notwithstanding the vast conquests and fame of the Macedonian monarch, continued unshaken in his fidelity to the Persians. Alexander was prevented by death from invading his dominions; but Perdicas marching against him with a powerful and well disciplined army, dispersed his forces, and having taken Ariarathes himself prisoner, crucified him, with all those of the royal blood whom he could get into his power. Diodorus tells us that he was killed in the battle. He is said to have reigned 82 years. His son Ariarathes III. having escaped the general slaughter of the royal family, fled into Armenia, where he lay concealed, till the civil dissensions which arose among the Macedonians gave him a fair opportunity of recovering his paternal kingdom. Amyntas, at that time the governor of Cappadocia, opposed him; but being defeated in a pitched battle, the Macedonians were obliged to abandon all the strong holds. Ariarathes, after a long and peaceable reign, left his kingdom to his son Ariarathes II. He applied himself more to the arts of peace than war, in consequence of which Cappadocia flourished greatly during his reign. He was succeeded by his son Ariarathes IV. who proved a very warlike prince, and having overcome Arsaces, founder of the Parthian monarchy, considerably enlarged his own dominions.

He was succeeded by Ariarathes V. who marrying the daughter of Antiochus the Great, entered into an alliance with that prince against the Romans; but Antiochus being defeated, the king of Cappadocia was obliged to sue for peace, which he obtained, after having paid 200 talents by way of fine, for taking up arms against the people of Rome. He afterwards assisted the republic with men and money against Perseus king of Macedon, on which account he was by the senate honoured with the title of the *friend and ally of the Roman people*. He left the kingdom in a very flourishing condition to his son Mithridates, who on his accession took the name of Ariarathes VI.

This prince (surnamed *Philopator*, from the filial respect and love he shewed his father from his very infancy) immediately renewed the alliance with Rome. Out of mere good-nature he restored Mithrobuzanes son to Ladriades king of the Lesser Armenia to his father's kingdom.

Cappadocia. kingdom, though he foresaw that the Armenians would lay hold of that opportunity to join Artaxias, who was then on the point of invading Cappadocia. These differences, however, were settled, before they came to an open rupture, by the Roman legates; and Ariarathes seeing himself thus delivered from an impending war by the mediation of the republic, presented the senate with a golden crown, and offered his service wherever they thought proper to employ him. The senate in return sent him a staff, and chair of ivory; which were presents usually bestowed on those only whom they looked upon as attached to their interest. Not long before this, Demetrius Soter king of Syria had offered Ariarathes his sister in marriage, the widow of Perseus king of Macedon: but this offer the king of Cappadocia was obliged to decline for fear of offending the Romans; and his so doing was in the highest degree acceptable to the republic, who reckoned him among the chief of her allies. Demetrius, however, being greatly incensed at the slight put upon his sister, set up a pretender to the throne, one Orophernes, a supposititious, or, as others call him, a natural son of the deceased king. The Romans ordered Eumenes king of Pergamus to assist Ariarathes with all his forces: which he did, but to no purpose; for the confederates were overthrown by Demetrius, and Ariarathes was obliged to abandon the kingdom to his rival. This happened about 159 years before Christ, and the usurpers immediately dispatched ambassadors to Rome with a golden crown. The senate declined accepting the present, till they heard his pretensions to the kingdom; and this Orophernes, by suborned witnesses, made appear so plain, that the senate decreed that Ariarathes and he should reign as partners; but next year, Orophernes was driven out by Attalus brother to Eumenes, and his successor by the kingdom of Pergamus.

Ariarathes, being thus restored, immediately demanded of the Prieniens 400 talents of gold which Orophernes had deposited with them. They honestly replied, that as they had been trusted with the money by Orophernes, they could deliver it to none but himself, or such as came in his name. Upon this, the king entered their territories with an army, destroying all with fire and sword. The Prieniens, however, still persevered in their integrity; and though their city was besieged by the united forces of Ariarathes and Attalus, not only made an obstinate defence, but found means to restore the sum to Orophernes. At last they applied to the Romans for assistance, who enjoined the two kings to raise the siege, under pain of being declared enemies to the republic. Ariarathes immediately obeyed; and marching his army into Assyria, joined Alexander Epiphanes against Demetrius Soter, by whom he had been formerly driven out of his kingdom. In the very first engagement Demetrius was slain, and his army entirely dispersed, Ariarathes having on that occasion given uncommon proofs of his courage and conduct. Some years after, a war breaking out between the Romans and Arsitonicus who claimed the kingdom of Pergamus in right of his father, Ariarathes joined the former, and was slain in the same battle in which P. Crassus proconsul of Asia was taken, and the Roman army cut in pieces. He left six sons by his wife Laodice, on whom the Romans bestowed Lycania and Cilicia. But Laodice, fearing lest her children, when

they came of age, should take the government out of Cappadocia, her hands, poisoned five of them, the youngest only having escaped her cruelty by being conveyed out of the kingdom. The queen herself was soon after put to death by her subjects, who could not bear her cruel and tyrannical government.

Laodice was succeeded by Ariarathes VII. who, soon after his accession, married another Laodice, daughter of Mithridates the Great, hoping to find in that prince a powerful friend to support him against Nicomedes king of Bithynia, who laid claim to part of Cappadocia. But Mithridates, instead of assisting, procured one Gordius to poison, his unhappy son-in-law; and, on his death, seized the kingdom, under pretence of maintaining the rights of the Cappadocians against Nicomedes, till the children of Ariarathes were in a condition to govern the kingdom. The Cappadocians at first fancied themselves obliged to their new protector; but, finding him unwilling to resign the kingdom to the lawful heir, they rose up in arms, and, driving out all the garrisons placed by Mithridates, placed on the throne Ariarathes VIII. eldest son of their deceased king.

The new prince found himself immediately engaged in a war with Nicomedes; but, being assisted by Mithridates, not only drove him out of Cappadocia, but stripped him of a great part of his hereditary dominions. On the conclusion of the peace, Mithridates seeking for some pretence to quarrel with Ariarathes, insisted upon his recalling Gordius, who had murdered his father; which being rejected with abhorrence, a war ensued. Mithridates took the field first, in hopes of over-running Cappadocia before Ariarathes could be in a condition to make head against him; but, contrary to his expectation, he was met on the frontiers by the king of Cappadocia with an army no way inferior to his own. Hereupon he invited Ariarathes to a conference; and, in sight of both armies, stabbed him with a dagger, which he had concealed under his garment. This struck such terror into the Cappadocians, that they immediately dispersed, and gave Mithridates an opportunity of possessing himself of the kingdom without the least opposition. The Cappadocians, however, not able to endure the tyranny of his prefects, soon shook off the yoke; and recalling the king's brother, who had fled into the province of Asia, proclaimed him king. He was scarce seated on the throne, however, before Mithridates invaded the kingdom at the head of a very numerous army, and having drawn Ariarathes to a battle, defeated his army with great slaughter, and obliged him to abandon the kingdom. The unhappy prince soon after died of grief; and Mithridates bestowed the kingdom on his son, who was then but eight years old, giving him also the name of *Ariarathes*. But Nicomedes Philopator king of Bithynia, fearing lest Mithridates, having now got possession of the whole kingdom of Cappadocia, should invade his territories, suborned a youth to pass himself for the third son of Ariarathes, and to present to them a petition in order to be restored to his father's kingdom. With him he sent to Rome Laodice, sister of Mithridates, whom he had married after the death of her former husband Ariarathes. Laodice declared before the senate, that she had three sons by Ariarathes, and that the petitioner was one of them; but that she had been obliged

ged to keep him concealed, lest he should undergo the same fate with his brothers. The senate assured him that they would at all events reinstate him in his kingdom. But, in the mean time, Mithridates having notice of these transactions, dispatched Gordius to Rome, to undeceive the senate, and to persuade them that the youth to whom he had resigned the kingdom of Cappadocia was the lawful son of the late king, and grandson to Ariarathes who had lost his life in the service of the Romans against Aristonicus. This unexpected embassy put the senate upon inquiring more narrowly into the matter, whereby the whole plot was discovered; upon which Mithridates was ordered to resign Cappadocia, and the kingdom was declared free. The Cappadocians, however, in a short time sent ambassadors to Rome, acquainting the senate that they could not live without a king. This greatly surprised the Romans, who had such an aversion to royal authority; but they gave them leave to elect a king of their own nation. As the family of Pharnaces was now extinct, the Cappadocians chose Ariobarzanes; and their choice was approved by the senate, he having on all occasions shown himself a steady friend to the Romans.

Ariobarzanes had scarce taken possession of his kingdom, when he was driven out by Tigranes king of Armenia; who resigned Cappadocia to the son of Mithridates, in pursuance of an alliance previously concluded between the two parties. Ariobarzanes fled to Rome; and, having engaged the senate in his cause, he returned into Asia with Sylla, who was enjoined to restore him to his kingdom. This was easily performed by Sylla, who, with a small body of troops, routed Gordius who came to meet him on the borders of Cappadocia at the head of a numerous army. Sylla, however, had scarce turned his back, when Ariobarzanes was again driven out by Ariarathes the son of Mithridates, on whom Tigranes had bestowed the kingdom of Cappadocia. This obliged Sylla to return into Asia, where he was attended with his usual success, and Ariobarzanes was again placed on the throne. After the death of Sylla, he was the third time forced by Mithridates to abandon his kingdom; but Pompey, having entirely defeated Mithridates near mount Stella, restored Ariobarzanes to his throne, and rewarded him for his services during the war, with the provinces of Sophene, Gordiene, and great part of Cilicia. The king, however, being now advanced in years, and desirous of spending the remainder of his life in ease, resigned the crown to his son Ariobarzanes, in presence of Pompey; and never afterwards troubled himself with affairs of state.

Ariobarzanes II. proved no less faithful to the Romans than his father had been. On the breaking out of the civil war between Cæsar and Pompey, he sided with the latter; but after the death of Pompey, he was received into favour by Cæsar, who even bestowed upon him great part of Armenia. While Cæsar was engaged in a war with the Egyptians, Pharnaces king of Pontus invaded Cappadocia, and stripped Ariobarzanes of all his dominions; but Cæsar, having defeated Pharnaces, restored the king of Cappadocia, and honoured him with new titles of friendship. After the murder of Cæsar, Ariobarzanes, having refused to join Brutus and Cassius, was by them declared an enemy to the republic, and soon after taken prisoner and put

to death. He was succeeded by his brother Ariobarzanes III. who was, by Marc Anthony, deprived both of his kingdom and life; and in him ended the family of Ariobarzanes.

Archelaus, the grandson of that general of the same name who commanded against Sylla in the Mithridatic war, was by Marc Anthony placed on the throne of Cappadocia, though nowise related either to the family of Pharnaces or Ariobarzanes. His preference was entirely owing to his mother Glaphyra, a woman of great beauty, but of a loose behaviour, who, in return for her compliance with the desires of Anthony, obtained the kingdom of Cappadocia for her son. In the war between Augustus and Anthony, he joined the latter; but, at the intercession of the Cappadocians, was pardoned by the emperor. He afterwards received from him Armenia the Lesser, and Cilicia Trachea, for having assisted the Romans in clearing the seas of pirates who greatly infested the coasts of Asia. He contracted a strict friendship with Herod the Great, king of Judæa; and even married his daughter Glaphyra to Alexander, Herod's son. In the reign of Tiberius, Archelaus was summoned to appear before the senate; for he had always been hated by that emperor, because in his retirement at Rhodes he had paid him no sort of respect. This had proceeded from no aversion in him to Tiberius, but from the warning given Archelaus to his friends at Rome. For Caius Cæsar, the presumptive heir to the empire, was then alive, and had been sent to compose the differences of the east, whence the friendship of Tiberius was then looked upon as dangerous. But when he came to the empire, Tiberius, remembering the disrespect shewn him by Archelaus, enticed the latter to Rome by means of letters from Livia, who promised him her son Tiberius's pardon, provided he came in person to implore it. Archelaus obeyed the summons, and hastened to Rome; where he was received by the emperor with great wrath and contempt, and soon after accused as a criminal in the senate. The crimes of which he was accused were mere fictions; but his concern at seeing himself treated as a malefactor was so great, that he died soon after of grief, or, as others say, laid violent hands on himself. He is said to have reigned 50 years.

On the death of Archelaus, the kingdom of Cappadocia was reduced to a Roman province, and governed by those of the equestrian order. It continued subject to the Romans till the invasion of the eastern empire by the Turks, to whom it is now subject, but has no distinguishing modern name. In what was anciently called *Cappadocia*, however, the Turks have four Beglerbegs, called *Sivas*, *Trebizond*, *Marasch*, and *Cogni*.

In the time of the Romans, the inhabitants of Cappadocia bore so bad a character, and were reputed so vicious and lewd, that, among the neighbouring nations, a wicked man was emphatically called a *Cappadocian*. In after ages, however, their lewd disposition was so corrected and restrained by the pure doctrines of Christianity, that no country whatever has produced greater champions of the Christian religion, or given to the church prelates of more unblemished characters.

We have now no system of the Cappadocian laws, and scarce wherewithal to form any particular idea of them. As to their commerce, they carried on a considerable

Cappadocia trade in horses, great numbers of which were produced in their country; and we read of them in Scripture as frequenting the fairs of Tyre with this commodity. As Cappadocia abounded with mines of silver, brass, iron, and alum, and afforded great store of alabaster, crystal, and jasper, it is probable that they might supply the neighbouring countries with these commodities.

The religion of the ancient Cappadocians was much the same with that of the Persians. At Comana there was a rich and stately temple dedicated to Bellona; whose battles the priests and their attendants used to represent on stated days, cutting and wounding each other as if seized with an enthusiastic fury. No less famous and magnificent were the temples of Apollo Catantius, and of Jupiter: the last of which had 3000 sacred servants, or religious votaries. The chief priest was next in rank to that of Comana; and, according to Strabo, had an yearly revenue of 15 talents. Diana Persica was worshipped in a city called *Casaballa*, where women, devoted to the worship of that goddess, were reported to tread barefooted on burning coals, without receiving any hurt. The temples of Diana at Diospolis, and of Anias at Zela, were likewise held in great veneration both by the Cappadocians and Armenians, who flocked to them from all parts. In the latter were tendered all oaths in matters of consequence; and the chief among the priests was no way inferior in dignity, power, and wealth, to any in the kingdom; having a royal attendance, and an unlimited authority over all the inferior servants and officers of the temple. The Romans, who willingly adopted all the superstitions and superstitious rites of the nations they conquered, greatly increased the revenues of this and other temples; conferring the priesthood on such as they thought most fit for carrying on their designs.—We are told that human sacrifices were offered at Comana; and that this barbarous custom was brought by Orestes and his sister Iphigenia from Taurica Scythica, where men and women were immolated to Diana. But this custom, if ever it obtained in Cappadocia, was abolished in the times of the Romans.

CAPPANUS, a name given by some authors to a worm that adheres to and gnaws the bottoms of ships; to which it is extremely pernicious, especially in the East and West Indies: to prevent this, several ships have lately been sheathed with copper; the first trial of which was made on his majesty's frigate the *Alarm*.

CAPPARIS, the CAPER-BUSH; a genus of the myogynia order, belonging to the polyandria class of plants. There are seven species. The spinosa, or common caper, is a low shrub, generally growing out of the joints of old walls, the fissures of rocks, and amongst rubbish, in most of the warm parts of Europe: it hath woody stalks, which send out many lateral slender branches; under each of these are placed two short crooked spines, between which and the branches comes out the foot-stalks of the leaves, which are single, short, and sustain a round, smooth, entire leaf. At the intermediate joints between the branches, come out the flowers on long foot-stalks; before these expand, the bud with the empalement is gathered for pickling. Those which are last, expand in form of a single rosette, having five large white petals, which are roundish and concave; in the

middle are placed a great number of long filamina, surrounding a style which rises above them, and crowned with an oval germin, which afterwards becomes a capsule filled with kidney-shaped seeds.

Culture. This plant is very difficultly preserved in Britain: it delights to grow in crevices of rocks, old walls, &c. and always thrives best in an horizontal posture; so that, when planted either in pots, or in the full ground, they seldom thrive, though they may be kept alive for some years. They are propagated by seeds in the warm parts of Europe, but very seldom in Britain.

Uses. The buds, pickled with vinegar, &c. are brought to Britain annually from Italy and the Mediterranean. They are supposed to excite appetite and assist digestion; and to be particularly useful as detergents and aperients in obstructions of the liver and spleen.

CAPRA, or GOAT, a genus of quadrupeds belonging to the order of pecora. The horns are hollow, turned upwards, erect, and scabrous. There are eight fore-teeth in the under jaw, and none in the upper; and they have no dog-teeth. This genus consists of 12 species, *viz.*

I. The HIRCUS, or common goat, with arched carinated horns, and a long beard. It is a native of the eastern mountains.

The goat is an animal of more sagacity than the sheep. Instead of having an antipathy at mankind, they voluntarily mingle with them, and are easily tamed. Even in uninhabited countries, they betray no savage dispositions. In the year 1698, an English vessel having put in to the island of Bonavista, two negroes came aboard, and offered gratis to the captain as many goats as he pleased. The captain expressed his astonishment at this offer. But the negroes replied, that there were only 12 persons in the island; that the goats had multiplied to such a degree, that they were become extremely troublesome; and that, instead of having any difficulty in catching them, they followed the men wherever they went, and were so obstinately officious, that they could not get quit of them upon any account whatever.

Goats are sensible of caresses, and capable of a considerable degree of friendship. They are stronger, more agile, and less timid, than sheep. They have a lively, capricious, and wandering disposition; are fond of high and solitary places; and frequently sleep upon the very points of rocks. They are more easily supported than any other animal of the same size; for there is hardly an herb, or the bark of a tree, which they will not eat with pleasure. Neither are they liable to so many diseases as sheep: they can bear heat and cold with less inconvenience. The actions and movements of animals depend more upon the force and variety of their sensations, than the structure of their bodies: the natural inconstancy or frivolidness of goats is accordingly expressed by the irregularity of their actions: they walk, stop short, run, jump, show, and hide themselves, as it were by mere caprice, and without any other cause than what arises from the natural vivacity of their temper.

The buck will copulate when he is a year old, and the female when he is seven months. But as this is rather premature, they are generally restrained till they be

Capparis,
Capra.

Capra.

Capra.

be 18 months or two years. The buck is bald, beautiful, and vigorous; one is sufficient to serve 150 females. A buck for propagation should be large, handsome, and about two years of age; his neck should be short, and fleshy; his head slender; his ears pendent; his thighs thick; his limbs firm; his hair black, thick, and soft; and his beard should be long and bushy. The females are generally in season from September to the end of November. At that time the males drive whole flocks of the females continually from place to place, and fill the whole atmosphere around them with their strong disagreeable odour; which, tho' as disagreeable as asafetida itself, yet may be conducive to prevent many distempers, and to cure nervous and hysterical ones. Horses are supposed to be much refreshed by it; on which account many people keep a he-goat in their stables or stalls.

Goats go with young four months and an half, and bring forth from the latter end of February to the latter end of April: having only two teats, they generally bring forth but one or two young; sometimes three; and in good warm pastures there have been instances, tho' rare, of their bringing forth four at a time. They continue fruitful till they are seven years of age; but a buck goat is seldom kept after he is five. Both young and old are affected by the weather; a rainy season makes them thin, a dry sunny one makes them fat and blythe: their excessive venery prevents their longevity; for in our climate they seldom live above 11 or 12 years.

The food of this animal costs next to nothing, as it lives mostly upon such plants as are rejected by other cattle, and can support itself even upon the most barren mountains. But their produce is valuable. The whitest wigs are made of its hair; for which purpose that of the he-goat is most in request: the whitest and clearest is selected from that which grows on the haunches, where it is longest and thickest: a good skin well haired is sold for a guinea; though a skin of bad hue, and so yellow as to baffle the barber's skill to bleach, will not fetch above 18 d. or 2 s. The Welsh goats are far superior in size, and in length and fineness of hair, to those of other mountainous countries. Their usual colour is white: those of France and the Alps are short-haired, reddish, and the horns small. Boliters made from the hair of a goat were in use in the days of Saul, as appears from 1 Samuel xix. 13. The species very probably was the Angora goat, which is only found in the East; and whose soft and silky hair supplied a most luxurious couch.

The suet of the goat is in great esteem as well as the hair. Many of the inhabitants of Caernarvonshire suffer these animals to run wild on the rocks in winter as well as in summer; and kill them in October for the sake of their fat, either by shooting them with bullets, or by running them down with dogs like deer. The goats killed for this purpose are about four or five years old. Their suet will make candles far superior in whiteness and goodness to those made from that of the sheep or the ox, and accordingly brings a much greater price in the market; nor are the horns without their use, the country people making of them excellent handles for tucks and pen-knives. The skin is peculiarly well adapted for the glove manufactory, especially that of the kid: abroad it is dressed and made into stockings, bed-

ticks, bed-hangings, sheets, and even shirts. In the army it covers the horseman's arms, and carries the foot-soldier's provisions. As it takes a dye better than any other skin, it was formerly much used for hangings in the houses of people of fortune, being susceptible of the richest colours, and when flowered and adorned with gold and silver became an elegant and superb furniture.

The flesh is of great use to the inhabitants of those countries which abound with goats; and affords them a cheap and plentiful provision in the winter months, when the kids are brought to market. The haunches of the goat are frequently salted and dried, and supply all the uses of bacon: this by the Welsh is called *cob yr wden*, or hung venison. The meat of a splayed goat of six or seven years old (which is called *hyff*) is reckoned the best; being generally very fat and sweet. This makes an excellent patty; goes under the name of *rock venison*; and is little inferior to that of the deer.

The milk of the goat is sweet, nourishing, and medicinal. It is an excellent succedaneum for ass's milk; and has (with a tea-spoonful of harts horn drunk warm in bed in the morning, and at four in the afternoon, and repeated for some time) been a cure for phthical people before they were gone too far. In some of the mountainous parts of Scotland and Ireland, the milk is made into whey, which has done wonders in this and other cases where coolers and restoratives are necessary; and to many of those places there is as great a resort of patients of all ranks, as there is in England to the spas or baths. It is not surprising that the milk of this animal is so salutary, as it grows only on the tops, tendrils, and flowers, of the mountain shrubs, and medicinal herbs; rejecting the grosser parts. The blood of the he-goat, dried, was formerly reckoned a specific in pleurisy, and is even taken notice of by Dr Mead for this purpose, but is now deservedly neglected. Cheese made of goat's milk is much valued in some of our mountainous countries, when kept to a proper age; but has a peculiar taste and flavour.

II. The *IBEX*, or wild-goat, is the stock from whence the tame species sprung. It has large knotty horns reclined upon its back, is of a yellowish colour, and its beard is black. The females are less, and have smaller horns, more like those of a common he-goat, and with few knobs on the upper surface: they bring one young one, seldom two, at a birth. They inhabit the highest Alps of the Grisons country and the Valais; are also found in Crete. They are very wild, and difficult to be shot, as they always keep on the highest points. Their chase is exceedingly dangerous: being very strong, they often tumble the incautious huntsman down the precipices, except he has time to lie down and let the animals pass over him. They are said not to be long-lived.

III. The *MAMBRINA*, or Syrian goat, with reclined horns, pendent ears, and a beard. It is a native of the East. Their ears are of a vast length; from one to two feet; and sometimes so troublesome, that the owners cut off one to enable the animal to feed with more ease. These animals supply Aleppo with milk.

IV. The *RUPICAPRA*, or Ramo-goat, has erect and hooked horns. The body is of a dusky red colour; but the front, top of the head, gullet, and inside of the ears, are white; the under part of the tail is blackish; and

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the upper lip is a little divided. It inhabits the Alps of Dauphine, Switzerland, and Italy; the Pyrenean mountains; Greece, and Crete: does not dwell so high in the hills as the ibex, and is found in greater numbers. They feed before sun-rise, and after sun-set. In winter, they lodge in hollows of the rocks, to avoid the falls of the Avelanches: during that season, they eat the slender twigs of trees, or the roots of plants and herbs which they find beneath the snow. They are very timid and watchful: each herd has its leader, who keeps sentry on some high place while the rest are at food; and if it sees an enemy, gives a sharp sort of hiss, by way of signal, when they instantly take to flight. They have a most piercing eye, and quick ear and scent; and are excessively swift and active. They are hunted during winter for their skins, which are very useful in manufactures; and for their flesh, which is very well tasted. The chase is a laborious employ: they must be got at by surprise, and are often shot with rifle-barrel'd guns. In their stomach is often a hairy ball, covered with a hard crust, of an oblong form. They are said to be long-lived; bring two, seldom three, young ones at a time.

V. The *DEPRESSA*, is an African goat, with small depressed horns, bent inwards, lying on the head. It is about the size of a kid; and the hair is long and pendulous.

VI. The *REVERSA*, is likewise an African goat, with erect horns, and curved back at the points. It is about the size of a kid of a year old.

VII. The *GAZZELLA*, has long, erect, cylindrical horns, annulated near the base. It inhabits Egypt, the Cape, Arabia, the Levant, and India, dwelling in the plains.

VIII. The *CERVICAPRA*, with plated cylindrical horns, inhabits Barbary. The hair near the horns is longer than in any other part of the body. The females want horns: Mr Hasselquist gives the following account of this species. "The cervicapra is larger, swifter, and wilder, than the common rock-goat, and can scarcely be taken without a falcon. It is met with near Aleppo. I have seen a variety of this which is common in the East, and the horns appear different; perhaps it is a distinct species. This animal loves the smoke of tobacco; and, when caught alive, will approach the pipe of the huntsman, though otherwise more timid than any animal. This is perhaps the only creature, besides man, that delights in the smell of a poisonous and stinking plant. The Arabians hunt it with a falcon (*falco gentilis*, Lin.) I had an excellent opportunity of seeing this sport near Nazareth in Galilee. An Arab, mounted on a swift courser, held the falcon in his hand, as huntsmen commonly do: when he espied the rock-goat on the top of a mountain, he let loose the falcon, which flew in a direct line like an arrow, and attacked the animal; fixing the talons of one of his feet into the cheek of the creature, and the other into its throat, extending his wings obliquely over the animal; spreading one towards one of its ears, and the other to the opposite hip. The animal, thus attacked, made a leap twice the height of a man, and freed himself from the falcon: but being wounded, and losing his strength and speed, he was again attacked by the falcon; which fixed the talons of both its feet into the throat of the animal, and held it fast, till the hunt-

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man coming up, took it alive, and cut its throat; the falcon drinking the blood as a reward for his labour. A young falcon, which was learning, was likewise put to the throat of the goat: by this means are young falcons taught to fix their talons in the throat of the animal, as being the properest part; for should the falcon fix them in the creature's hip, or some other part of the body, the huntsman would not only lose his game, but his falcon also: for the animal, roused by the wound, which could not prove mortal, would run to the defarts and the tops of the mountains, whither its enemy, keeping its hold, would be obliged to follow; and, being separated from its master, must of course perish."

IX. The *BEZOARTICA*, or bezoar goat, is bearded, and has cylindrical, arched, and wholly annulated horns. It is a native of Persia. The bezoar is found in one of its stomachs, called *abomasus* *.

* See Bezoar, and Abomasus.

X. The *TARTARICA*, has cylindrical, straight, annulated horns; the points inclining inward, the ends smooth; the other part surrounded with very prominent annuli; of a pale yellow colour, and the greatest part femipellucid; the cutting teeth are placed so loose in their sockets, as to move with the least touch. The male is covered with rough hair like the he-goat, and has a very strong smell; the female is smoother. The hair on the bottom of the sides and the throat is long, and resembles wool; that on the sides of the neck and head is hoary; the back and sides of a dirty white; the breast, belly, and inside of the thighs, of a shining white. The females are hornless and timid: if attacked by wolves or dogs, the males place them in a circle, and stand round them with their heads towards the enemy, and will defend them stoutly. They bleat like sheep: their common pace is a trot; when they go faster, it is by leaps. They are swifter than roebucks. They feed by lifting up the upper mandible, and going backward. The skin is soft, and excellent for gloves, belts, &c. Their best season is in September: at other times, the skins are penetrated by worms. The fat resembles that of mutton; in taste, like that of a buck: the head is reckoned the most delicate part. They are found between the Tanais and Boristhenes, and as far as Astracan, in flocks of 6000 or 10,000.

XI. The *AMMON*, has femicircular, plain, white horns, and no beard. It is about the size of a ram, and is a native of Siberia.

XII. The *DORCAS*, or antelope, has cylindrical annulated horns, bent backward, contorted, and arising from the front between the eyes. It is a native of Africa and Mexico. These animals are of a most elegant and active make; of a restless and timid disposition; extremely watchful; of great vivacity; remarkably swift; exceedingly agile; and most of their boundings so light, so elastic, as to strike the spectator with astonishment. What is very singular, they will stop in the middle of their course for a moment gaze at their pursuers, and then resume their flight.

As the chase of these animals is a favourite diversion with the Eastern nations, from that may be collected proofs of the rapid speed of the antelope tribe. The grey-hound, the fleetest of dogs, is unequal in the course; and the sportsman is obliged to call in the aid of the falcon trained to the work, to seize on the animal and impede its motions, to give the dogs time to overtake it. In India and Persia a sort of leopard is made use of in the chase;

Capra
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tion.

chace: this is an animal that takes its prey, not by swiftness of foot, but by the greatnets of its springs, by motions similar to that of the antelope; but should the leopard fail in its first essay, the game escapes.

Some species of the antelopes form herds of 2000 or 3000, while others keep in small troops of five or six. They generally reside in hilly countries; though some inhabit plains: they often browse like the goat, and feed on the tender shoots of trees, which gives their flesh an excellent flavour. This is to be understood of those that are taken in the chace; for those that are fattened in houses are far less delicious. The flesh of some species are said to taste of musk, which perhaps depends on the qualities of the plants they feed on.

Mr Pennant makes the antelope a distinct genus of animals, forming a link between the goat and the deer*: with the first of which they agree in the texture of the horns, which have a core in them, and they never cast them; with the last, in the elegance of their form, and great swiftness. He distinguishes several species, among which he ranks the *gasella*, the *ceruicapra*, the *bezartica*, and the *tartarica* of Linnaeus, described above, VII. VIII. IX. X. with the *moschus grimmia* of the same author.

CAPRA-Saltans, in meteorology, a fiery meteor or exhalation sometimes seen in the atmosphere. It forms an inflected line, resembling in some measure the caperings of a goat; whence it has its name.

CAPRAIA, an isle of Italy, in the Tuscan sea, to the north-east of Corsica, on which it depends. It is pretty populous, and has a strong castle for its defence. It is about 15 miles in circumference. E. Long. 11. 5. N. Lat. 43. 15.

CAPRARIA, in botany, a genus of the angiosperma order, belonging to the didynamia class of plants. There is but one species, the biflora, which is a native of the warm parts of America. Being a troublesome weed, and without beauty, it is never cultivated, except in botanic gardens for the sake of variety.

CAPRAROLA, one of the most magnificent palaces in Italy, seated on a hill, in Ronciglione, whose foot is watered by the river Tircia. It was built by cardinal Farnese; and has five fronts, in the middle of which is a round court, though all the rooms are square, and well proportioned. It is 27 miles north-west of Rome.

CAPRÆ. See CAPRI.

CAPREOLUS (Elias), an excellent civilian, and learned historian, born in Brescia in Italy, wrote an history of Brescia, and other works: died in 1519.

CAPRI, (anciently *Capræ*), a city and island at the entrance of the gulph of Naples, E. Long. 14. 50. N. Lat. 40. 45.—The island is only four miles long, and one broad; the city is a bishop's see, situated on a high rock at the west end of the island. Capræ was anciently famous for the retreat of the emperor Tiberius for seven years, during which he indulged himself in the most scandalous debaucheries*. There stood a pharos on this island, which, a few days before the death of that emperor, was overthrown by an earthquake.

CAPRIATA (Peter John), a civilian and historian, was born at Genoa. He wrote, in Italian, the history of the wars of Italy; an English translation of which was printed in London in 1663.

CAPRICORN, in astronomy, one of the 12 signs

of the zodiac. See ASTRONOMY, n° 206.

The ancients accounted Capricorn the tenth sign; and when the sun arrived thereat, it made the winter solstice with regard to our hemisphere: but the stars having advanced a whole sign towards the east, Capricorn is now rather the 11th sign; and it is at the sun's entry into Sagittary that the solstice happens, though the ancient manner of speaking is still retained.

This sign is represented on ancient monuments, medals, &c. as having the forepart of a goat and the hindpart of a fish, which is the form of an *Ægipan*; sometimes simply under the form of a goat.

Tropic of CAPRICORN, a lesser circle of the sphere, which is parallel to the equinoctial, and at 23° 30' distance from it southwards; passing through the beginning of Capricorn.

CAPRIFICATION, a method used in the Levant, for ripening the fruit of the domestic fig-tree, by means of insects bred in that of the wild fig-tree.

The most ample and satisfactory accounts of this curious operation in gardening are those of Tournefort and Pontedera; the former, in his Voyage to the Levant, and in a Memoir delivered to the academy of sciences at Paris in 1705; the latter, in his *Anthologia*. The substance of Tournefort's account follows. "Of the thirty species or varieties of the domestic fig-tree which are cultivated in France, Spain, and Italy, there are but two cultivated in the Archipelago. The first species is called *ornos*, from the old Greek *erinos*, which answers to *caprificus* in Latin, and signifies a wild fig-tree. The second is the domestic or garden fig-tree. The former bears successively, in the same year, three sorts of fruit, called *ornites*, *cratitires*, and *orni*; which, though not good to eat, are found absolutely necessary towards ripening those of the garden-fig. These fruits have a sleek even skin; are of a deep green colour; and contain in their dry and mealy inside several male and female flowers placed upon distinct foot-stalks, the former above the latter. The *ornites* appear in August, and continue to November without ripening: in these are bred small worms, which turn to a sort of gnats nowhere to be seen but about these trees. In October and November, these gnats of themselves make a puncture into the second fruit, which is called *cratitires*. These do not show themselves till towards the end of September. The *ornites* gradually fall away after the gnats are gone; the *cratitires*, on the contrary, remain on the tree till May, and inclose the eggs deposited by the gnats when they pricked them. In May, the third sort of fruit, called *orni*, begins to be produced by the wild fig-trees. This is much bigger than the other two; and when it grows to a certain size, and its bud begins to open, it is pricked in that part by the gnats of the *cratitires*, which are strong enough to go from one fruit to another to deposit their eggs. It sometimes happens that the gnats of the *cratitires* are slow to come forth in certain parts, while the *orni* in those very parts are disposed to receive them. In this case, the husbandman is obliged to look for the *cratitires* in another part, and fix them at the ends of the branches of those fig-trees whose *orni* are in a fit disposition to be pricked by the gnats. If they miss the opportunity, the *orni* fall, and the gnats of the *cratitires* fly away. None but those that are well acquainted with the culture know the critical moment of doing this: and in order

* See *Tiberius*.

order to know it, their eye is perpetually fixed on the bud of the fig; for that part not only indicates the time that the pricklers are to issue forth, but also when the fig is to be successfully pricked: if the bud is too hard and compact, the gnat cannot lay its eggs; and the fig drops, when the bud is too open.

"The use of all these three sorts of fruit is to ripen the fruit of the garden fig-tree, in the following manner. During the months of June and July, the peasants take the *orni*, at the time their gnats are ready to break out, and carry them to the garden fig-trees: if they do not nick the moment, the *orni* fall; and the fruit of the domestic fig-tree, not ripening, will in a very little time fall in like manner. The peasants are so well acquainted with these precious moments, that, every morning, in making their inspection, they only transfer to their garden fig-trees such *orni* as are well conditioned, otherwise they lose their crop. In this case, however, they have one remedy, though an indifferent one; which is, to strew over the garden fig-trees another plant in whose fruit there is also a species of gnats which answer the purpose in some measure."

The caprification of the ancient Greeks and Romans, described by Theophrastus, Plutarch, Pliny, and other authors of antiquity, corresponds in every circumstance with what is practised at this day in the Archipelago and in Italy. These all agree in declaring, that the wild fig-tree, *caprificus*, never ripened its fruit; but was absolutely necessary for ripening that of the garden or domestic fig, over which the husbandmen suspended its branches.—The reason of this success possibly may be, that, by the punctures of these insects, the vessels of the fruit are lacerated, and thereby a greater quantity of nutritious juice derived thither. Perhaps, too, in depositing their eggs, the gnats leave behind them some sort of liquor proper to ferment gently with the milk of the figs, and to make their flesh tender. The figs in Provence, and even at Paris, ripen much sooner for having their buds pricked with a straw dipped in olive-oil. Plumbs and pears likewise, pricked by some insects, ripen much the faster for it; and the flesh round such puncture is better tasted than the rest. It is not to be disputed, that considerable changes happen to the contexture of fruits so pricked, just the same as to parts of animals pierced with any sharp instrument.

CAPRIMULGUS, GOAT-SUCKER, or *Fern-owl*, in ornithology, a genus of birds belonging to the order of passeress. The beak is incurved, small, tapering, and depressed at the base; the mouth opens very wide. There are two species. 1. The European, with the tubes of the nostrils hardly visible. It feeds on moths, gnats, doris or chaffers; from which Chariton calls it a *dorr-hawuk*, its food being entirely of that species of beetle during the month of July, the period of that insect's flight in this country. This bird migrates. It makes but a short stay with us: appears the latter end of May; and disappears, in the northern parts of our island, the latter end of August; but, in the southern, stays above a month later. It inhabits all parts of Britain from Cornwall to the county of Ross. Mr Scopoli seems to credit the report of their sucking the teats of goats, an error delivered down from the days of Aristotle. Its notes are most singular. The loudest so much resembles that of a large spinning wheel, that the Welsh call this bird *aderyn y droll*, or the wheel-bird. It be-

gins its song most punctually on the close of day, sitting usually on a bare bough, with the head lower than the tail, the lower jaw quivering with the efforts. The noise is so very violent, as to give a sensible vibration to any little building it chanced to alight on and emit this species of note. The other is a sharp squeak, which it repeats often; this seems a note of love, as it is observed to reiterate it when in pursuit of the female among the trees. It lays its eggs on the bare ground; usually two: they are of a long form, of a whitish hue, prettily marbled with reddish brown. The length of this bird is 10½ inches; extent 22. Plumage, a beautiful mixture of white, black, ash-colour, and ferruginous, disposed in lines, bars, and spots. The male is distinguished from the female by a great oval white spot near the end of the three first quill-feathers, and another on the outmost feathers of the tail.—2. The Americanus, has the tubes of the nostrils very conspicuous. It is a night-bird, and is found in America.

CAPRIOLES, in the menage, leaps that a horse makes in the same place without advancing, in such a manner, that, when he is at the height of the leap, he jerks out with his hinder legs even and near. It is the most difficult of all the high menage. It differs from a croupade, in this, that, in a croupade, a horse does not show his shoes; and from a ballotade, because in this he does not jerk out. To make a horse work well at caprioles, he must be put between two pillars, and taught to raise first his fore-quarters, and then his hind-quarters while his fore ones are yet in the air; for which end you must give him the whip and the pincion.

CAPSA, (anc. geog.), a large and strong town of Nomidia, situated amidst vast deserts, waste, uncultivated, and full of serpents, where Jugurtha kept his treasure. In his time it was taken and rased by Marius the Roman general, who put to death all the citizens capable of bearing arms, and sold the rest for slaves. It was, however, afterwards rebuilt by the Romans, and strongly fortified; but, on the decline of their empire, was taken and demolished a second time, by Odeba a famous Arab general. The walls of the citadel are still remaining, and are monuments of the ancient glory and strength of Capsa. They are 24 fathoms in height, and five in thickness, built of large square stones, and have now acquired the solidity and firmness of a rock. The walls of the town were rebuilt by the inhabitants since their first demolition; but were afterwards destroyed by Jacob Almanzar, who sent a governor and troops into the province. In Marmol's time Capsa was very populous, and abounded with stately mosques and other structures of superb and elegant workmanship: but at present it is occupied by a poor and indigent people, fleeced and oppressed by the Tunesse government. In the very centre of the city stands an inclosed fountain, which both supplies the people with drink, and affords them an agreeable bath. The adjacent country is now cultivated, and produces several kinds of fruits; but the climate is unhealthy. The inhabitants are remarkable for their peevishness of temper. Both men and women dress handsomely except their feet, which they cover with coarse shoes of bungling workmanship, and made of the rough skins of wild beasts, equally inconvenient and unbecoming. E. Long. 9. 3. N. Lat. 33. 15.

CAP.

Capsicum,

CAPSICUM, or **GUINEA-PEPPER** a genus of the monogynia order, belonging to the pentandria class of plants.

Species. 1. The annuum, with oblong fruit, is the common long-podded capsicum commonly cultivated in the gardens. Of this there is one kind with red, and another with yellow fruit: and of these there are several varieties, differing only in the size and figure of their fruit. 2. The tetragonum, commonly called *bell pepper*. The fruit of this is red, and is the only kind proper for pickling, the skin being tender; whereas those of the other sorts are thin and tough. The pods are from an inch to an inch and half or two inches long; are very large, swelling, and wrinkled, flattened at the top, where they are angular, and sometimes stand erect, at others grow downward. 3. The cerasiforme, with a round smooth fruit, doth not grow so tall as the other sorts, but spreads near the ground; the leaves come out in clusters, are of a shining green, and stand on long footstalks. The fruit is of a beautiful red, and of the size of a cherry. 4. The pyramidale, is a native of Egypt, and hath much narrower leaves than the other sorts. The pods always grow erect, and are produced in great plenty, so that the plants make a good appearance for three months in the winter. 5. The minimum, commonly called *bird-pepper*, rises with a shrubby stalk four or five feet high; the leaves are of a lucid green; the fruit grows at the division of the branches, standing erect: these are small, oval, and of a bright red; they are much more sharp and biting than those of the other sorts. Besides these species, botanists describe as many more; viz. the cordiforme, with heart-shaped fruit; the angulosum, with angular heart-shaped fruit; the oliviforme, with oval fruit; the conoide, commonly called *hen-pepper*, with a conical red fruit growing erect; and the frutescens, with small pyramidal fruit growing erect; commonly called *Barbary pepper*. These, however, have no remarkable properties different from the others.

Culture. The three first species are annual plants, and must be propagated by seeds sown on a hot-bed in the spring, and treated in the same manner with other exotics; they will however bear the open air, after being inured to it by degrees. The plants of the second sort, whose fruit is used for pickling, should be taken from the hot-bed, and planted in a rich spot of ground in a warm situation about a foot and an half asunder. They must be shaded till they have taken root, and afterwards duly watered in dry weather, which will greatly promote their growth and cause them to be more fruitful, and likewise enlarge the size of the fruit. By this management, three or four crops of fruit for pickling may be obtained the same year. The other sorts are more tender; and therefore must be planted in pots plunged in a moderate hot-bed, and sheltered under a frame.

Uses, &c. The second sort, as already observed, produces fruit fit for pickling; for which purpose they must be gathered before they arrive at their full size, while their rind is tender. They must be slit down on one side to get out the seeds, after which they should be soaked two or three days in salt and water; when they are taken out of this and drained, boiling vinegar must be poured on them in a sufficient quantity to cover them, and closely stopped down for two months;

then they should be boiled in the vinegar to make them green; but they want no addition of any spice, and are the wholefomest and best pickle in the world. The tenth species is used for making what is called *cayenne-butter*, or *pepper-pots*, by the inhabitants of America, and which they esteem the best of all the spices. The following is a receipt for making of a pepper-pot. Take of the ripe seeds of this sort of capsicum, and dry them well in the sun: then put them into an earthen or stone pot, mixing flour between every stratum of pods; and put them into an oven after the baking of bread, that they may be thoroughly dried: after which they must be well cleaned from the flour; and if any of the stalks remain adhering to the pods, they should be taken off, and the pods reduced to a fine powder: to every ounce of this add a pound of wheat-flour, and as much leaven as is sufficient for the quantity intended. After this has been properly mixed and wrought, it should be made into small cakes, and baked in the same manner as common cakes of the same size: then cut them into small parts, and bake them again, that they may be as dry and hard as biscuit; which being powdered and sifted, is to be kept for use. This is prodigiously hot and acrimonious, setting the mouth as it were on fire. It is by some recommended as a medicine for flatulencies; but it is greatly to be doubted whether all those hot irritating medicines are not productive of more harm than good, in this country at least. If the ripe pods of capsicum are thrown into the fire, they will raise strong and noisome vapours, which occasion vehement sneezing, coughing, and often vomiting, in those who are near the place, or in the room where they are burnt. Some persons have mixed the powder of these pods with snuff, to give to others for diversion: but where it is in quantity, there may be danger in using it; for it will occasion such violent fits of sneezing, as to break the blood-vessels of the head.

CAPSQUARES, strong plates of iron which come over the trunnions of a gun, and keep it in the carriage. They are fastened by a hinge to the prize-plate, that they may lift up and down, and form a part of an arch in the middle to receive a third part of the thickness of the trunnions: for two thirds are let into the carriage, and the other end is fastened by two iron wedges called the *fore-locks* and *keys*.

CAPSTAN, or **CAPSTERN**, a strong massy column of timber, formed like a truncated cone, and having its upper extremity pierced with a number of holes to receive the bars or levers. It is let perpendicularly down through the decks of a ship; and is fixed in such a manner, that the men, by turning it horizontally with their bars, may perform any work which requires an extraordinary effort.

A capstern is composed of several parts, where *A* is Plate the barrel, *b* the whelps, *c* the drum-head, and *d* the spindle. The whelps rise out from the main body of the capstern like buttresses, to enlarge the sweep, so that a greater quantity of cable, or whatever rope encircles the barrel, may be wound about it at one turn, without adding much to the weight of the capstern. The whelps reach downwards from the lower part of the drum-head to the deck. The drum-head is a broad, cylindrical piece of wood resembling a mill-stone, and fixed immediately above the barrel and whelps. On the outside of this piece are cut a number of square holes.

Capsicum
Capitan.

LXVII.
fig. 5.

Capstan.

holes parallel to the deck to receive the bars. The spindle or pivot *d*, which is fixed with iron, is the axis or foot upon which the capstern rests, and turns round in the faucy, which is a sort of iron socket let into a wooden block or standard called the *step*, resting upon and bolted to the beams.

Besides the different parts of the capstern above explained, it is furnished with several appurtenances, as the *bars*, the *pins*, the *pawls*, the *swifter*, and the *saucer*, already described. The bars are long pieces of wood, or arms, thrust into a number of square holes in the drum-head all round, in which they are as the radii of a circle, or the spokes in the nave of a wheel. They are used to heave the capstern round, which is done by the men setting their breasts against them, and walking about, like the machinery of a horse-mill, till the operation is finished.—The pins *e*, are little bolts of iron thrust perpendicularly through the holes of the drum-head, and through a correspondent hole in the end of the bar, made to receive the pins when the bars are fixed. They are used to confine the bars, and to prevent them from working out as the men heave, or when the ship labours. Every pin is fastened to the drum-head with a small iron chain; and that the bars may exactly fit their respective holes, they are all numbered.—The pawls *f*, n° 1. are situated on each side the capstern, being two short bars of iron, bolted at one end through the deck to the beams close to the lower part of the whelps; the other end, which occasionally turns round on the deck, being placed in the intervals of the whelps, as the capstern turns round, prevents it from recoiling or turning back by any sudden jerk of the cable, as the ship rises on the sea, which might greatly endanger the men who heave. There are also hanging pawls *g*, n° 3. used for the same purposes, reaching from the deck above to the drum-head immediately below it. The swifter is a rope passed horizontally thro' holes in the outer end of the bars, and drawn very tight; the intent of this is to keep the men steady as they walk round when the ship rocks, and to give room for a greater number to assist by pulling upon the swifter itself.

The most frequent use of the capstern is to heave in the cable, and thereby remove the ship, or draw up the anchor. It is also used to wind up any weighty body, as the masts, artillery, &c. In merchant-ships it is likewise frequently employed to discharge or take in the cargo, particularly when consisting of weighty materials that require a great exertion of mechanical powers to be removed.

There are commonly two capsterns in a man of war, the *main* and the *gear* capstern; the former of which has two drum-heads, and may be called a *double one*. This is represented in n° 3. The latter is represented in n° 2.

Formerly the bars of the capstern went entirely thro' the head of it, and consequently were more than double the length of the present ones; the holes were therefore formed at different heights, as represented in n° 1. But this machine had several inconveniences, and has long been entirely disused in the navy. Some of these sort of capsterns, however, are still retained in merchant-ships, and are usually denominated *crabs*. The situation of the bars in a crab, as ready for heaving, is represented in n° 4.

Capsule,
Captain.

To Rig the CAPSTERN, is to fix the bars in their respective holes, and thrust in the pins, in order to confine them.—*Surge the CAPSTERN*, is the order to slacken the rope heaved round upon it, of which there are generally two turns and a half about the barrel at once, and sometimes three turns.—*To Heave the CAPSTERN*, is to go round with it heaving on the bars, and drawing in any rope of which the purchase is created.—*To Come-up the CAPSTERN*, is to let go the rope upon which they had been heaving.—*To Pawl the CAPSTERN*, is to fix the pawls to prevent it from recoiling during any pause of heaving.

CAPSULE, in a general sense, denotes a receptacle or cover in form of a bag.

CAPSULE, among botanists, a dry, hollow, seed-vessel, or pericarpium, that cleaves or splits in some determinate manner. See **PERICARPIMUM**.

This species of seed-vessel is frequently fleshy and succulent, like a berry, before it has attained maturity; but, in ripening, becomes dry, and often so elastic as to dart the seeds from their departments with considerable velocity. This elasticity is remarkably conspicuous in wood-forrel; balsam, *impatiens*; African spiræa, *dissona*; fraxinella; *justicia*; *ruellia*; *barleria*; *lathræa*; and many others.—The general aptitude or disposition of this species of seed-vessel to cleave or separate for the purpose of dispersing its seeds, distinguishes it not less remarkably than its texture from the pulpy or succulent fruits of the apple, berry, and cherry kind. This opening of the capsule for discharging its seeds when the fruit is ripe, is either at the top, as in most plants; at the bottom, as in triglochin; at the side through a pore, or small hole, as in campanula and orchis; horizontally, as in plantain, *amaranthus*, and *anagallis*; or longitudinally, as in convolvulus. All fruit that is jointed, opens at every one of the joints, each of which contains a single seed. Capsules, in splitting, are divided, externally, into one or more pieces, called by Linnæus, *valves*. The internal divisions of the capsules are called *cells*, *loculamenta*; these, in point of number, are exceedingly diversified; some having only one cell, as the primrose; and others many, as the water-lily. Hence a capsule is termed *unilocular*, *bilocular*, *trilocular*, &c. according as it has one, two, three, &c. cells or cavities.

CAPSULE Atrabiliarie, called also *glandule renales*, and *renes succenturiati*. See **ANATOMY**, n° 361.

CAPTAIN, a military officer, whereof there are several kinds, according to their commands.

CAPTAIN of a Troop or Company, an inferior officer who commands a troop of horse, or a company of foot, under a colonel. The duty of this officer is to be careful to keep his company full of able-bodied soldiers; to visit their tents and lodgings, to see what is wanting; to pay them well; to cause them keep themselves neat and clean in their cloaths, and their arms bright. He has power in his own company of making sergeants, corporals, and lanfepades.

In the horse and foot guards, the captains have the rank of colonels.

CAPTAIN-General, he who commands in chief.

CAPTAIN Lieutenant, he who with the rank of captain, but the pay of lieutenant, commands a troop or company in the name and place of some other person who is dispensed with on account of his quality from per-

Captain. performing the functions of his post.

Thus the colonel being usually captain of the first company of his regiment, that company is commanded by his deputy under the title of *captain lieutenant*.

So in England, as well as in France, the king, queen, dauphin, princes, &c. have usually the title of captain of the guards, *gens d'armes*, &c. the real duty of which offices is performed by captain-lieutenants.

CAPTAIN Reformed, one who, upon the reduction of the forces, has his commission and company suppressed; yet is continued captain, either as second to another, or without any post or command at all.

CAPTAIN of a Ship of War, the officer who commands a ship of the line of battle, or a frigate carrying 20 or more cannon. The charge of a captain in his majesty's navy is very comprehensive, in as much as he is not only answerable for any bad conduct in the military government, navigation, and equipment of of the ship he commands, but also for any neglect of duty or ill management in his inferior officers, whose several charges he is appointed to superintend and regulate.

On his first receiving information of the condition and quality of the ship he is appointed to command, he must attend her constantly, and hasten the necessary preparations to fit her for sea. So strict, indeed, are the injunctions laid on him by the lord high admiral, or commissioners of the admiralty, that he is forbid to lie out of his ship, from his arrival on board to the day of his discharge, unless by particular leave from the admiralty or from his commander in chief. He is enjoined to show a laudable example of honour and virtue to the officers and men; and to discountenance all dissolute, immoral, and disorderly practices, and such as are contrary to the rules of subordination and discipline; as well as to correct those who are guilty of such offences as are punishable according to the usage of the sea. He is ordered particularly to survey all the military stores which are sent on board, and to return whatever is deemed unfit for service. His diligence and application are required to procure his complement of men; observing carefully to enter only such as are fit for the necessary duty, that the government may not be put to unnecessary expence. When his ship is fully manned, he is expected to keep the established number of men complete, and superintend the muster himself if there is no clerk of the check at the port. When his ship is employed on a cruising station, he is expected to keep the sea the whole length of time previously appointed; but if he is compelled by some unexpected accident to return to port sooner than the time limited, he ought to be very cautious in the choice of a good situation for anchoring, ordering the master or other careful officers to found and discover the depths of water and dangers of the coast. Previous to any possibility of an engagement with the enemy, he is to quarter the officers and men to the necessary stations according to their office and abilities, and to exercise them in the management of the artillery, that they may be more expert in time of battle. His station in the time of an engagement, is on the quarter-deck: at which time he is expected to take all opportunities of annoying his enemy, and improving every advantage over him; to exhibit an example of courage and fortitude to his officers and crew; and to

place his ship opposite to his adversary in such a position as that every cannon shall do effectual execution. At the time of his arrival in port, after his return from abroad, he is to assemble his officers, and draw up a detail of the observations that have been made during the voyage, of the qualities of the ship as to her trim, ballast, stowage, manner of sailing, for the information and direction of those who may succeed him in the command: and this account is to be signed by himself and officers, and to be returned to the resident commissioner of the navy at the port where the ship is discharged.

CAPTAIN of a Merchant-ship, he who has the direction of the ship, her crew, and lading, &c. In small ships and short voyages, he is more ordinarily called the *master*. In the Mediterranean, he is called the *patron*.—The proprietor of the vessel appoints the captain or master; and he is to form the crew, and choose and hire the pilots, mates, and seamen; though, when the proprietor and master reside on the same spot, they generally act in concert together.

CAPTAIN Bashaw, or *Capodan Bashaw*, in the polity of the Turks, signifies the Turkish high admiral. He possesses the third office of the empire, and is invested with the same power at sea that the vizir has on shore. Soliman II. instituted this office in favour of the famous Barbarossa, with absolute authority over the officers of the marine and arsenal, whom he may punish, cashier, or put to death, as soon as he is without the Dardanelles. He commands in chief in all the maritime countries, cities, castles, &c. and at Constantinople, is the first magistrate of police in the villages on the side of the Porte, and the canal of the Black-Sea. The mark of his authority is a large Indian cane, which he carries in his hand, both in the arsenal and with the army.—The captain-bashaw enjoys two sorts of revenues; the one fixed, the other casual. The first arise from a capitation of the islands in the Archipelago, and certain governments in Naxos and Galipoli. The latter consist in the pay of the men who die during a campaign; in a fifth of all prizes made by the begs; in the profits accruing from the labour of the slaves, whom he hires as rowers to the grand signior; and in the contributions he exacts in all places where he passes.

CAPTION, in Scots law, a writ issuing under his majesty's signet, in his majesty's name, obtained at the instance of a creditor in a civil debt, commanding messengers at arms and other officers of the law to apprehend and imprison the person of the debtor until he pay the debt.

CAPTIVE, a slave, or a person taken from the enemy.

Formerly captives in war became the slaves of those who took them; and though slavery, such as obtained among the ancients, is now abolished, some shadow of it still remains in respect of prisoners of war, who are accounted the property of their captors, and have no right to liberty but by concession from them.—The Romans used their captives with great severity; their necks were exposed to the soldiers to be trampled on, and their persons afterwards sold by public auction. Captives were frequently burnt in the funeral piles of the ancient warriors, as a sacrifice to the infernal gods. Those of royal or noble blood had their heads shaven,

Captain

Captive.

Captivity
||
Capuchins.

and their hair sent to Rome to serve as decorations for female toys, &c. They were led in triumph loaded with chains through Rome, in the emperor's train, at least as far as the foot of the Capitoline mount, for they were not permitted to ascend the sacred hill, but carried thence to prison. Those of the prime quality were honoured with golden chains on their hands and feet, and golden collars on their necks. If they made their escape, or killed themselves, to avoid the ignominy of being carried in triumph, their images or effigies were frequently carried in their place.

CAPTIVITY, in a general sense, the state or condition of a captive.

CAPTIVITY, in sacred history, a punishment which God inflicted upon his people for their vices and infidelities. The first of these captivities is that of Egypt, from which Moses delivered them; after which, are reckoned six during the government of the judges; but the greatest and most remarkable were those of Judah and Israel, which happened under the kings of each of these kingdoms. It is generally believed, that the ten tribes of Israel never came back again after their dispersion; and Josephus and St Jerom are of this opinion: nevertheless, when we examine the writings of the prophets, we find the return of Israel from captivity pointed out in a manner almost as clear as that of the tribes of Benjamin and Judah: See Hosea i. 10, 11. Amos ix. 14. The captivities of Judah are generally reckoned four; the fourth and last of which fell in the year of the world 3416, under Zedekiah: and from this period begins the 70 years captivity foretold by Jeremiah.

Since the destruction of the temple by the Romans, the Hebrews boast that they have always had their heads or particular princes, whom they call *princes of the captivity*, in the east and west. The princes of the captivity in the east governed the Jews that dwelt in Babylon, Assyria, and Persia; and the princes of the captivity in the west governed those who dwelt in Judæa, Egypt, Italy, and in other parts of the Roman empire. He who resided in Judæa commonly took up his abode at Tiberias, and assumed the name of *Roshabbath*, "head of the fathers or patriarchs." He presided in assemblies, decided in cases of conscience, levied taxes for the expenses of his visits, and had officers under him who were dispatched through the provinces for the execution of his orders. As to the princes of the captivity at Babylon, or the east, we know neither the original nor succession of them. It only appears that they were not in being before the end of the second century.

CAPUA, (anc. geog.) a very ancient city of Italy, in Campania, and capital of that district. It is famous for the abode of Hannibal the Carthaginian general after the battle of Cannæ, and where Livy accuses him, but unjustly, of having enervated himself with pleasures *. It still retains the name, and is the see of an archbishop. It is seated on the river Vulturno, in E. Long. 15. 5. N. Lat. 41. 7.

CAPUCHINS, religious of the order of St Francis in its strictest observance; deriving their name from *capuce*, or *capuchon*, a stuff cap, or cowl, wherewith they cover their heads. They are clothed with brown, or grey; always bare-footed; are never to go in a coach, nor ever shave their beard.—The capuchins are a re-

form made from the order of minors, commonly called *cordeliers*, set on foot in the 16th century, by Matthew Baschi, a religious observant of the monastery of Montefalcone; who, being at Rome, was advertised several times from heaven, to practise the rule of St Francis to the letter. Upon this, he made application to pope Clement in 1525; who gave him permission to retire into a solitude, with as many others as chose to embrace the strict observance. In 1528, they obtained the pope's bull. In 1529, the order was brought into complete form; Matthew was elected general, and the chapter made constitutions. In 1543, the right of preaching was taken from the capuchins by the pope: but in 1545, it was restored to them again with honour. In 1578, there were already 17 general chapters in the order of capuchins.

CAPUT LUPINUM. Anciently an outlawed felon was said to have *caput lupinum*, and might be knocked on the head like an wolf; by any one that should meet him; because, having renounced all law, he was to be dealt with as in a state of nature, when every one that should find him might slay him: yet now, to avoid such inhumanity, it is holden that no man is entitled to kill him wantonly and wilfully; but in so doing he is guilty of murder, unless it is done in the endeavour to apprehend him.

CAPUT Mortuum, a Latin name given to fixed and exhausted residuums remaining in retorts after distillations. As these residuums are very different, according to the substances distilled, and the degree of heat employed, they are by the more accurate modern chemists particularly specified by adding a term denoting their qualities; as *earthy residuum*, *cherry residuum*, *saline residuum*, &c.

CARABINE, a fire-arm shorter than a musket, carrying a ball of 24 in the pound, borne by the light horse, hanging at a belt over the left shoulder. The barrel is two feet and an half long; and is sometimes furrowed spirally within, which is said to add to the range of the piece.

CARABINEERS, regiments of light horse, carrying longer carabines than the rest, and sometimes used on foot.

CARABUS, in zoology, a genus of insects belonging to the order of coleoptera, or the beetle kind. The feelers are bristly; the breast is shaped like a heart, and margined; and the elytra are likewise margined. There are 43 species of this genus, mostly distinguished by their colour. The most remarkable is the crepitans, or bombardier, with the breast, head, and legs, ferruginous or iron-coloured, and the elytra black. It keeps itself concealed among stones, and seems to make little use of its wings: when it moves, it is by a sort of jump; and whenever it is touched, one is surprised to hear a noise resembling the discharge of a musket in miniature, during which a blue smoke may be perceived to proceed from its anus. The insect may be made at any time to play off its artillery, by scratching its back with a needle. If we may believe Rolander, who first made these observations, it can give 20 discharges successively. A bladder placed near the anus is the arsenal whence it derives its store, and this is its chief defence against an enemy, although the smoke emitted seems to be altogether inoffensive, except it be by causing a fright, or concealing its course. Its chief enemy is another

Caput
||
Carabus.

* See
Carthage,
no 123.

another species of the same genus, but four times larger: when purfued and fatigued, the bombardier has recourfe to this stratagem, by lying down in the path of the large carabus, which advances with open mouth and claws to feize it; but, on the difcharge of this artillery, fuddenly draws back, and remains a while confuted: during which the bombardier conceals himfelf in fome neighbouring crevice; and if not happy enough to find one, the large carabus returns to the attack, takes the infect by the head, and tears it off.

CARACALLA (M. Antoninus Baffianus), emperor after his father Severus in 211, put the phyficians to death for not difpatching his father as he would have had them. He killed his brother Geta; and put Papinianus to death, becaufe he would not defend nor excufe his parricide. In fhort, it is faid that 20,000 perfons were maffacred by his order. He married Julia, his father's widow. Going to Alexandria, he flew the inhabitants, and applied to the magicians and astrologers. At laft, going from Edella to Mefopotamia, one of his captains flew him, by order of Macrinus, who fucceeded him. He died after he had reigned fomewhat more than fix years.

CARACCAS, a diftrict of Terra Firma in South America, belonging to the Spaniards. The coaft is rocky and mountainous, interperfed with fmall fertile valleys; fubjected at certain feafons of the year to dry north-weft winds, but bleffed in general with a clear air and wholefome climate. A very great illicit trade is carried on by the Englifh and Dutch with this province, notwithstanding all the vigilance of the Spaniards, who have fcouts perpetually employed, and breakworks raifed in all the valleys. A vaft number of cacao-trees are cultivated in this province; and it is reckoned that the crop of cacao produced here amounts to more than 100,000 fanegas of 110 pounds each. The country of Santa Fe confumes 20,000; Mexico a little more; the Canaries a fmall cargo; and Europe from 50 to 60,000. The cultivation of the plant employs 10 or 12,000 negroes. Such of them as have obtained their liberty have built a little town called *Nirva*, into which they will not admit any white people. The chief town is likewife called *Caraccas*, and is fituated in N. Lat. 10. 10. Dampier fays it ftands at a confiderable diftance from the fea; is large, wealthy, and populous; and extremely difficult of access, by reafon of the fteep and craggy hills over which an enemy muft take his route. The commerce of this town, to which the bay of Guaira at two leagues diftance ferves for a harbour, was for a long time open to all the fubjects of the Spanifh monarchy, and is ftill fo to the Americans; but the Europeans are not fo well treated. In 1728 a company was formed at St Sebaftian, which obtained an exclufive right of maintaining connections with this part of the new world. Four or five fhips, which they difpatch every year, fail from thence, but they return to Cadiz.

CARACCI, (Lewis, Auguftin, and Hannibal), three celebrated painters of the Lombard fchool, all of Bologna. Lewis was born in 1555; and was coufin-german to Auguftin and Hannibal who were brothers, the fons of a taylor who was yet careful to give them a liberal education. They were both difciples of their coufin Lewis. Auguftin gained a knowledge of mathematics, natural philofophy, mufic, poetry, and moft of the liberal arts; but, though painting was his

principal purfuit, he learned the art of engraving from Cornelius Cort, and furpaffed all the mafters of his time. Hannibal, again, never deviated from his pencil.—Thefe three painters, at length, having reaped all the advantages they could by contemplation and practice, formed a plan of afociation, continued always together, and laid the foundation of that celebrated fchool which has ever fince been known by the name of *Caracci's academy*. Hither all the young ftudents, who had a view of becoming mafters, reforted to be inftructed in the rudiments of painting; and here the Caracci taught freely, and without referve, all that came. Lewis's charge was to make a collection of antique ftatues and bas-reliefs. They had defigns of the beft mafters, and a collection of curious books on all fubjects relating to their art; and they had a fkilful anatomift always ready to teach what belonged to the knitting and motions of the mufcles, &c. There were often difputations in the academy; and not only painters, but men of learned profefions, propofed queftions, which were always decided by Lewis. Every body was well received; and though ftated hours were allotted to treat of different matters, yet improvements might be made at all hours by the antiquities and the defigns which were to be feen.

The fame of the Caracci reaching Rome, the cardinal Farnefe fent for Hannibal thither, to paint the gallery of his palace. Hannibal was the more willing to go, becaufe he had a great defire to fee Raphael's works, with the antique ftatues and bas-reliefs. The gufto which he took there from the ancient fculpture, made him change his Bolognian manner for one more learned but lefs natural in the defign and in the colouring. Auguftin followed Hannibal, to affift him in his undertaking of the Farnefe gallery; but the brothers not rightly agreeing, Farnefe fent Auguftin to the court of the duke of Parma, where he died in the year 1602, being only 45 years of age. His moft celebrated piece of painting is that of the communion of St Jerom, in Bologna.

In the mean while, Hannibal continued working in the Farnefe gallery at Rome; and, after inconceivable pains and care, finifhed the paintings in the perfection in which they are now to be feen. He hoped that the cardinal would have rewarded him in fome proportion to the excellence of his work, and the time it took him up, which was eight years; but he was difappointed. The cardinal, influenced by an ignorant Spaniard his domeftic, gave him but a little above 200*l*. though it is certain he deferved more than twice as many thoufands. When the money was brought him, he was fo furprifed at the injuftice done him, that he could not fpeak a word to the perfon who brought it. This confirmed him in a melancholy to which his temper naturally inclined, and made him refolve never more to touch his pencil; which refolution he had undoubtedly kept, if his neceffities had not compelled him to break it. It is faid that his melancholy gained fo much upon him, that at certain times it deprived him of the ufe of his fenfes. It did not, however, put a flop to his amours; and his debauches at Naples, whither he had retired for the recovery of his health, brought a diftemper upon him of which he died in 1609, when he was 49 years of age. His veneration for Raphael was fo great, that it was his deathbed request to be buried in the fame

Caracci
||
Caract.

tomb with him; which was accordingly done, in the pantheon or rotunda at Rome. There are extant several prints of the blessed Virgin, and some other subjects etched by the hand of this incomparable artist. He is said to have been a friendly, plain, honest, and open-hearted man; very communicative to his scholars; and so extremely kind to them, that he generally kept his money in the same box with his colours, where they might have recourse to either as they had occasion.

While Hannibal Caracci worked at Rome, Lewis was courted from all parts of Lombardy, especially by the clergy, to make pictures in their churches; and we may judge of his capacity and facility, by the great number of pictures he made, and by the preference that was given him to other painters. In the midst of these employments, Hannibal solicited him to come and assist him in the Farnese gallery; and so earnestly, that he could not avoid complying with his request. He went to Rome; corrected several things in that gallery; painted a figure or two himself; and then returned to Bologna, where he died in 1619, aged 64.

CARACOL, in the menage, the half turn which an horseman makes, either to the right or left.—In the army, the horse always make a caracol after each discharge, in order to pass the rear of the Squadron.

CARACOL, in architecture, denotes a stair-case in a helix or spiral form.

CARACOLI, a kind of metal of which the Caribbees, or natives of the Lesser Antilles, make a sort of ornament in the form of a crescent, which they also call *caracoli*.—This metal comes from the main land; and the common opinion is, that it is a compound of silver, copper, and gold, something like the Corinthian brass among the ancients. These metals are so perfectly mixed and incorporated together, that the compound which results from them, it is said, has a colour that never alters, how long soever it remains in the sea or under ground. It is somewhat brittle; and they who work at it are obliged to mix a large proportion of gold with it, to make the compound more tough and malleable.

CARACT, or CARAT, the name of that weight which expresses the degree of fineness that gold is of. The word is also written, *caracti*, *carat*, *karact*, and *karrat*. Its origin is contested: But the most probable opinion is that of Kennet, who derives it from *carectia*, a term which anciently denoted any weight, and came not till of later days to be appropriated to that which expresses the fineness of gold and the gravity of diamonds.

These carats are not real determinate weights, but only imaginary. The whole mals, be the weight what it will, is conceived to be divided into 24 carats; and as many 24th parts as it contains of pure gold, it is called *gold of so many carats*, or *so many carats fine*. Thus, gold of 18 carats is a mixt, of which 18 parts is pure gold, and the other six an inferior metal, &c. This is the common way of reckoning in Europe, and at the gold mines in the Spanish West Indies, but with some variation in the subdivision of the carat: among us, it is divided into four grains; among the Germans, into 12 parts; and by the French, according to Mr Hellot, into 32. The Chinese reckon by a different division called *touchers*, of which the highest number, or that which denotes pure gold, is 100; so that 100 touches

correspond to our 24 carats, &c.

CARACT is also a certain weight which goldsmiths and jewellers use wherewith to weigh precious stones and pearls.—In this sense, the word is by some supposed to be derived from the Greek *καρκαριον*, a fruit which the Latins call *filiqua*, and we *carob bean*; each of which may weigh about four grains of wheat, whence the Latin *filiqua* has been used for a weight of four grains. This caract weighs four grains, but they are something lighter than the grains of other weights. Each of these grains is subdivided in $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, &c.

CARACTACUS, a renowned king of the ancient British people called *Silures*, inhabiting South Wales. Having valiantly defended his country seven years against the Romans, he was at length defeated; and flying to Cartimunda, queen of the Brigantes (inhabitants of Yorkshire), was by her treacherously delivered up to the Romans, and led in triumph to the emperor Claudius then at York; where his noble behaviour, and heroic but pathetic speech, obtained him not only his liberty, but the esteem of the emperor, A. D. 52.

CARAGROUTH, in commerce, a silver coin of the empire, weighing nine drachms. It goes at Constantinople for 120 alpers. There are four sorts of them, which are all equally current and of the same value.

CARAITES, in the ecclesiastical history of the Jews, a religious sect among that people, who adhere closely to the text and letter of the Scriptures, rejecting the rabbinical interpretations and the cabala. The Caraites pass for the most learned of the Jewish doctors. They are chiefly to be met with in Poland, Muscovy, and the East; and are but few in comparison of the bulk of the Jews who are of the party of the rabbins. The latter have so great an aversion to the Caraites, that they will have no alliance or even conversation with them: they treat them as bastards; and would a Carait turn rabbinist, the other Jews would not receive him.

CARAMANIA, a considerable province of Turkey, in Asia, in the south part of Natolia. Bajazet united this province to his empire about the year 1488, and since that time it has continued in the possession of the Turks. Satalia was the capital city, but is now much decayed.

CARAMANTA, a town of South America, and capital of a province of the same name in Terra Firma, and in the audience of Santa Fe. W. Long. 72. 35. N. Lat. 5. 18. The province of Caramanta is extended on both sides the river Cauca; and is bounded on the N. by the district of Carthagen, on the E. by New Granada, on the S. by Popayan, and on the W. by Popayan and by the audience of Panama. It is a valley surrounded on every side by very high mountains.

CARANNA, or KARANNA, a very scarce gum which comes from New Spain. It is said to possess many extraordinary medical virtues, but the present practice takes no notice of it.

CARANUS, the first king of Macedon, and the seventh of the race of the Heracleides. See MACEDONIA.

CARAT. See CARACT.

CARAVAGGIO (Michael Angelo da), a celebrated painter, born at Caravaggio, a village in Milan, in 1596. He was at first only a day-labourer: but having seen some painters at work upon a wall which he helped

Caract
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Caravaggio.

Caravaggio,
Caravan.

helped to raise, he was so charmed with their art, that he applied to the study of it; and made so considerable a progress in a few years, that he was admired at Rome, Venice, and other parts of Italy, as the author of a new style in painting. Upon his first going to Rome, he was compelled by his necessities to paint flowers and fruit, under Gioseppino; but growing tired of that subject, and returning to histories, he made use of a method quite different from that of Gioseppino, and followed nature as much too closely as the other departed from her, by imitating her defects as well as her beauties. Thus cramping his invention, he understood but little either of design or decorum in his compositions: he had however as good a gusto in colouring as he had a bad one in design. His pieces are to be found in most of the cabinets of Europe; and there is a picture of his drawing in the Dominican church at Antwerp, which Rubens used to call his *master*.

CARAVAN, or KARAVANNE, in the east, signifies a company or assembly of travellers and pilgrims, and more particularly of merchants, who, for their greater security, and in order to assist each other, march in a body through the deserts, and other dangerous places, which are infested with Arabs or robbers.

There are four regular caravans which go yearly to Mecca; the first from Damascus, composed of the pilgrims from Europe and Asia; the second from Cairo, for the Mahometans of Barbary; the third from Zibith, a place near the mouth of the Red Sea, where those of Arabia and India meet; the fourth from Babylon, where the Persians assemble.—Most of the inland commerce of the East is carried on by caravans. The late czar Peter the Great, established a trade between Russia and China by means of a caravan. M. Bignon, geographer to the duke of Lorraine, has given a treatise of the caravans of merchants in Asia; wherein he shews of what they are composed, how many forts there are, the several uses of the different sorts of animals in them; the prices given for them, the officers and men appointed to conduct them, and the pay of each, with their manner of marching, halting, fighting, retreating, &c.—Caravans of this kind are large convoys of armed men, merchants, and travellers, with divers sorts of animals for the carriage of their provisions. There are commonly four chief officers of a caravan, *viz.* the *caravan bachi*, or chief; the captain-guide; captain of rest; and captain of distribution. The first has absolute command over all the rest: the second is absolute in the march: the office of the third only commences when the caravan stops and makes a stay: to the fourth it belongs to dispose of every part of the corps, in case of an attack or battle; he has also the inspection over the distribution of provisions, which is made under him by several distributors, who give security to the master of the caravan, and have each of them a certain number of persons, elephants, dromedaries, &c. to take care of at their own peril. The treasurer of the caravan makes a fifth officer, who has under him several agents and interpreters, who keep journals of all that passes, for the satisfaction of those concerned in fitting out the caravan.

Any dealer is at liberty to form a company, in order to make a caravan. He in whose name it is raised, is considered as the *caravan bachi*, or chief of the caravan, unless he appoint some other in his place. If there are several merchants equally concerned, they e-

lect a *caravan bachi*; after which, they appoint officers to conduct the caravan and decide all controversies that may arise during the journey.

There are also sea caravans; established on the same footing, and for the same purposes: such is the *caravan of vessels*, from Constantinople to Alexandria.

CARAVANSERA, or KARAVANSERA, a place appointed for receiving and loading the caravans.

It is commonly a large square building, in the middle of which there is a very spacious court; and under the arches or piazzas that surround it there runs a bank, raised some feet above the ground, where the merchants, and those who travel with them in any capacity, take up their lodgings as well as they can; the beasts of burden being tied to the foot of the bank. Over the gates, that lead into the court, there are sometimes little rooms, which the keepers of the caravanseras let out at a very high price to such as have a mind to be private.

The caravanseras in the East are something of the nature of the inns in Europe; only that you meet with little accommodation either for man or beast, but are obliged to carry almost every thing with you: there is never a caravanera without a well, or spring of water. These buildings are chiefly owing to the charity of the Mahometans; they are esteemed sacred dwellings, where it is not permitted to insult any person, or to pillage any of the effects that are deposited there.—There are also caravaneras where most things may be had for money; and as the profits of these are considerable, the magistrates of the cities to whose jurisdiction they belong, take care to store them well. There is an inspector, who, at the departure of each caravan, fixes the price of the night's lodging, from which there is no appeal.

CARAVANSERASKIER, the steward or keeper of a CARAVANSERA.—He keeps an account of all the merchandises that are sold upon trust, and demands the payments of the sums due to the merchants for what has been sold in the caravanera, on the seller's paying two per cent.

CARAWAY, in botany. See CARUM.

CARBONADE, or CARBONADO, in cookery; flesh, fowl, or the like, seasoned, and broiled on the coals.

CARBUNCLE, in natural history, a very elegant gem, whose colour is deep red, with an admixture of scarlet.

This gem was known among the ancients by the name of *anthrax*. It is usually found pure and faultless, and is of the same degree of hardness with the sapphire: it is naturally of an angular figure; and is found adhering, by its base, to a heavy and ferruginous stone of the emery kind: its usual size is near a quarter of an inch in length, and two thirds of that in diameter in its thickest parts: when held up against the sun, it loses its deep tinge, and becomes exactly of the colour of a burning charcoal, whence the propriety of the name which the ancients gave it. It bears the fire unaltered, not parting with its colour, nor becoming at all the paler by it. It is found only in the East Indies, so far as is yet known; and there but very rarely.

CARBUNCLE, or *anthrax*, in medicine, an inflammation which arises, in time of the plague, with a vesicle or blister almost like that produced by burning.

CARBUNCLE, in heraldry, a charge or bearing, consisting

Caravanfera
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Carbuncle.

sifting of eight radii, four whereof make a common cross, and the other four a saltier.

Some call these radii *buttons*, or *flaves*, because round, and enriched with buttons, or pearly like pilgrims flaves, and frequently tipped or terminated with flower-de-luces; others blazon them, royal sceptres, placed in saltier, pale and fesse.

CARCASSE, or **CARCUSSE**, in the art of war, an iron-cage, or hollow capacity, about the bigness of a bomb, of an oval figure, made of ribs of iron, filled with combustible matters, as meal-powder, saltpetre, sulphur, broken glass, shavings of horn, turpentine, tallow, &c. It has two or three apertures out of which the fire is to blaze; and the design of it is to be thrown out of a mortar, to set houses on fire, and do other execution. It has the name *carcaffé*, because the circles which pass from one ring or plate to the other seem to represent the ribs of a human carcass.

CARCASSONE, an ancient city of France, in Lower Languedoc, with a bishop's see. It is divided into the upper and lower town. They are both surrounded with walls; and though their situations are different, they are both watered by the river Aude. The upper town is seated on a hill, with a castle that commands it, as well as the lower town. It is strong, not only by its situation on a craggy rock, but also by several large towers which are joined to its walls, and which render it of difficult access. The cathedral church is remarkable for nothing but its antiquity. The lower town is large, and built after the modern taste. The streets are very straight; and lead to a large square in the middle, from whence may be seen the four gates of the town. There is here a manufacture of cloth. The neighbouring country is full of olive-trees; and in the mountains there a fine marble, commonly called *marble of Languedoc*. E. Long. 2. 25. N. Lat. 43. 11.

CARCERES, in the ancient Circenian games, were inclosures in the circus, wherein the horses were restrained till the signal was given for starting, when, by an admirable contrivance, they all at once flew open.

CARCINOMA, in medicine; the same with **CANCER**.

CARD, among artificers, an instrument consisting of a block of wood, beset with sharp teeth, serving to arrange the hairs of wool, flax, hemp, and the like: there are different kinds of them, as hand-cards, stock-cards, &c. They are made as follows.

A piece of thick leather, of the size intended for the card, is strained in a frame for that purpose; and then pricked full of holes, into which the teeth or pieces of iron wire are inserted. After which the leather is nailed by the edges to a flat piece of wood, in the form of an oblong square, about a foot in length, and half a foot in breadth, with a handle placed in the middle of one of the longer sides.

The teeth are made in the following manner. The wire being drawn of the size intended, a skain or number of wires are cut into proper lengths by means of a gauge, and then doubled in a tool contrived for that purpose: after which they are bent into the proper direction by means of another tool; and then placed in the leather, as mentioned above.

CARDS, among gamblers, little pieces of fine thin pasteboard of an oblong figure, of several sizes; but

most commonly, in Britain, three inches and an half long, and two and an half broad, on which are painted several points and figures.

The moulds and blocks for making cards are exactly like those that were used for the first printed books. They lay a sheet of wet or moist paper on the block, which is first slightly done over with a sort of ink made of lamp-black diluted in water, and mixed with some starch to give it a body. They afterwards rub it off with a round list. The court-cards are coloured by means of several patterns, styled *flame-files*. These consist of papers cut through with a penknife; and in these apertures, they apply severally the various colours, as red, black, &c. These patterns are painted with oil-colours, that the brushes may not wear them out; and when the pattern is laid on the pasteboard, they slightly pass over it a brush-full of colour, which, leaving it within the openings, forms the face or figure of the card.

Among sharps, divers sorts of false and fraudulent cards have been contrived; as, 1. *Marked cards*, where the aces, kings, queens, knaves, are marked on the corners of the backs with spots of different number and order, either with clear water or water tinged with pale Indian ink, that those in the secret may distinguish them. Aces are marked with single spots on two corners opposite diagonally; kings with two spots at the same corners; knaves with the same number transversed. 2. *Brief cards*, those which are longer or broader than the rest; chiefly used at whist and piquet. The broad cards are usually for kings, queens, knaves, and aces; the long for the rest. Their design is to direct the cutting, to enable him in the secret to cut the cards disadvantageously to his adversary, and draw the person unacquainted with the fraud to cut them favourably for the sharper. As the pack is placed either endwise or sidewise to him that is to cut, the long or broad cards naturally lead him to cut to them. Brief cards are sometimes made thus by the manufacturer; but, in defect of these, sharps pare all but the breves with a penknife or razor. 3. *Corner bend*, denotes four cards turned down finely at one corner, to serve as a signal to cut by. 4. *Middle bend*, or Kingston-bridge, is where the tricks are bent two different ways, which causes an opening or arch in the middle, to direct likewise the cutting.

Cards were invented about the year 1390, to divert Charles VI. of France, who had fallen into a melancholy disposition. The inventor proposed, by the figures of the four suits or colours, as the French call them, to represent the four classes of men in the kingdom. By the *cœurs* (hearts) are meant the *gens de coeur*, choir-men, or ecclesiastics; and therefore the Spaniards, who certainly received the use of cards from the French, have *copas*, or chalices, instead of hearts. The nobility, or prime military part of the kingdom, are represented by the ends or points of lances or pikes; and our ignorance of the meaning or resemblance of the figure induced us to call them *spades*: The Spaniards have *espadas*, swords, in lieu of pikes, which are of similar import. By diamonds are designed the order of citizens, merchants, or tradesmen, *carreaux*, (square stones, tiles, or the like): The Spaniards have a coin, *dincros*, which answers to it; and the Dutch call the French word *carreaux* "*Arreuen*," stones and diamonds, from the form. *Trefle*, the trefoil-leaf, or clover-grass

grafs (corruptly called *clubs*), alludes to the husbandmen and peasants. But how this suit came to be called *clubs*, is not easily explained; unless, borrowing the game from the Spaniards, who have *kister* (Raves or clubs) instead of the trefoil, we give the Spanish signification to the French figure.

The history of the four kings, which the French, in drollery, sometimes call the *cards*, are David, Alexander, Cæsar, and Charles; which names were then, and still are, on the French cards. These respectable names represent the four celebrated monarchies of the Jews, Greeks, Romans, and Franks under Charlemagne. By the queens are intended Argine, Esther, Judith, and Pallas, (names retained in the French cards), typical of birth, piety, fortitude, and wisdom, the qualifications residing in each person. *Argine* is an anagram for *regina*, queen by descent. By the knaves were designed the servants to knights, (for *knave* originally meant only *servant*); but French pages and valets, now indiscriminately used by various orders of persons, were formerly only allowed to persons of quality, esquires (*escuires*) shield or armour bearers. Others fancy that the knights themselves were designed by those cards; because Hogiere and Lahire, two names on the French cards, were famous knights at the time cards were supposed to have been invented.

Deceptions wit CARDS. See LEGERDEMAIN, &c. l. i.

CARDAMINE, LADIES-SMOCK; a genus of the filifolia order, belonging to the tetradynamia class of plants. Of this there are 15 species; but the most remarkable is the *pratensis*, with a large purplish flower. This grows naturally in many parts of Britain, and is also called *cuckoo-flower*. There are four varieties, viz. the single, with purple and white flowers, which are frequently intermixed in the meadows; and the double, of both colours. The single sorts are not admitted into gardens; but the double deserve a place, as making a pretty appearance during the time they are in flower. They will thrive in a moist shady border; and are propagated by parting their roots, which is best performed in autumn. They delight in a soft loamy soil, not too stiff. By some the plant is reckoned antiscorbutic.

CARDAMOM, in the Materia Medica. See AMOMUM; and MATERIA MEDICA, n° 210, 211.

CARDAN (Jerom), one of the most extraordinary geniuses of his age, was born at Pavia on the 24th of September 1501. As his mother was not married, she tried every method to procure an abortion, but without effect. She was three days in labour, and they were at last obliged to cut the child from her. He was born with his head covered with black curled hair. When he was four years old, he was carried to Milan; his father being an advocate in that city. At the age of 20, he went to study in the university of that city; and two years afterwards, he explained Euclid. In 1524, he went to Padua; and the same year he was admitted to the degree of master of arts: in the end of the following year, he took the degree of doctor of physic. He married about the year 1531. For ten years before, his impotency had hindered him from having knowledge of a woman; which was a great mortification to him. He attributed it to the evil influences of the planet under which he was born. When he enumerates, as he frequently does, the greatest misfortunes of his life, this ten years impotency is always one. At

the age of 33, he became professor of mathematics at Milan. In 1539, he was admitted member of the college of physicians at Milan; in 1543, he read public lectures of medicine in that city, and at Pavia the year following; but discontinued them because he could not get payment of his salary, and returned to Milan. In 1552, he went into Scotland, having been sent for by the archbishop of St Andrews, who had in vain applied to the French king's physicians, and afterwards to those of the emperor of Germany. This prelate, then 40 years old, had for ten years been afflicted with a shortness of breath, which returned every eight days for the two last years. He began to recover from the moment that Cardan prescribed for him. Cardan took his leave of him at the end of six weeks and three days, leaving him prescriptions which in two years wrought a complete cure.

Cardan's journey to Scotland gave him an opportunity of visiting several countries. He crossed France in going thither; and returned through Germany, and the Low Countries, along the banks of the Rhine. It was on this occasion he went to London and calculated king Edward's nativity. This tour took up about four months: after which, coming back to Milan, he continued there till the beginning of October 1552; and then went to Pavia, from whence he was invited to Bologna in 1562. He taught in this last city till the year 1570; at which time he was thrown into prison; but some months after, he was sent home to his own house. He left Bologna in 1571; and went to Rome, where he lived for some time without any public employment. He was, however, admitted a member of the college of physicians, and received a pension from the Pope. He died at Rome on the 21st of September 1575, according to Thuanus. This account might be sufficient to show the reader that Cardan was of a very fickle temper; but he will have a much better idea of his singular and odd turn of mind by examining what he himself has written concerning his own good and bad qualities. He paid himself congratulatory compliments for not having a friend in this world; but that, in requital, he was attended by anaërial spirit, emanated partly from Saturn and partly from Mercury, who was the constant guide of his actions, and teacher of every duty to which he was bound. He declared too, that he was so irregular in his manner of walking the streets, as induced all beholders to point at him as a fool. Sometimes he walked very slowly, like a man absorbed in profound meditation; then all on a sudden quickened his steps, accompanying them with very absurd attitudes. In Bologna his delight was to be drawn about in a mean vehicle with three wheels. When nature did not visit him with any pain, he would procure to himself that disagreeable sensation by biting his lips so wantonly, or pulling his fingers to such a vehement degree, as sometimes to force the tears from his eyes: and the reason he assigned for so doing, was to moderate certain impetuous sallies of the mind, the violence of which was to him by far more insupportable than pain itself; and that the sure consequence of such a severe discipline was the enjoying the pleasure of health. He says elsewhere, that, in his greatest tortures of soul, he used to whip his legs with rods, and bite his left arm; that it was a great relief to him to weep, but that very often he could not;

that

Cardan.

that nothing gave him more pleasure than to talk of things which made the whole company uneasy; that he spoke on all subjects, in season and out of season; and he was so fond of games of chance, as to spend whole days in them, to the great prejudice of his family and reputation, for he even flaked his furniture and his wife's jewels.

Cardanus makes no scruple of owning that he was revengeful, envious, treacherous, a dealer in the black art, a backbiter, a calumniator, and addicted to all the foul and detestable excesses that can be imagined; yet, notwithstanding (as one would think) so humbling a declaration, there was never perhaps a vainer mortal, or one that with less ceremony expressed the high opinion he had of himself, than Cardanus was known to do, as will appear by the following proofs. "I have been admired by many nations; an infinite number of panegyrics, both in prose and verse, have been composed to celebrate my fame. I was born to release the world from the manifold errors under which it groaned. What I have found out could not be discovered either by my predecessors or my contemporaries; and that is the reason why those authors who write any thing worthy of being remembered, scruple not to own that they are indebted to me for it. I have composed a book on the dialectic art, in which there is neither one superfluous letter nor one deficient. I finished it in seven days, which seems a prodigy. Yet where is there a person to be found, that can boast of his having become master of its doctrine in a year? And he that shall have comprehended it in that time, must appear to have been instructed by a familiar demon."

The same capriciousness observable in his outward conduct is to be observed in the composition of his works. We have a multitude of his treatises in which the reader is stopped almost every moment by the obscurity of his text, or his digressions from the point in hand. In his arithmetical performances there are several discourses on the motions of the planets, on the creation, and on the tower of Babel. In his dialectic work, we find his judgment on historians and the writers of epistles. The only apology which he makes for the frequency of his digressions is, that they were purposely done for the sooner filling up of his sheet, his bargain with the bookseller being at so much per sheet; and that he worked as much for his daily support, as for the acquisition of glory. The Lyons edition of his works, printed in 1663, consists of ten volumes in folio.

It was Cardanus who revived in latter times all the secret philosophy of the Cabbala or Cabbalists, which filled the world with spirits; a likeness to whom, he asserted, we might attain by purifying ourselves with philosophy. He chose for himself, however, notwithstanding such reveries, this fine device, *Tempus mea possessio, tempus meus ager*: "Time is my sole possession, and the only fund I have to improve."

In fact, when we consider the transcendent qualities of Cardan's mind, we cannot deny his having cultivated it with every species of knowledge, and his having made a greater progress in philosophy, in the medical art, in astronomy, in mathematics, &c. than the greatest part of his contemporaries who had applied their minds but to one of those sciences.

Scaliger affirms, that Cardan, having fixed the time

of his death, abstained from food, that his prediction might be fulfilled, and that his continuance to live might not discredit his art. Cardan's father, who was a doctor of medicine, and a professor of civil and canon law, died in the same manner, in the year 1524, having abstained from all sustenance for nine days. His son tells us, that he had white eyes, and could see in the night-time.

CARDIAC, in a general sense, signifies all medicines beneficial to the heart, whether internally or externally applied. The word comes from the Greek word *καρδια*, *cor*; the heart being reputed the immediate seat of their operation.

CARDIACS, in a more particular sense, denote medicines which raise the spirits, and give present strength and cheerfulness; these amount to the same with what are popularly called *cordials*. Cardiacs are medicines anciently supposed to exert themselves immediately in comforting and strengthening the heart: but the modern physicians rather suppose them to produce the effect by putting the blood into a gentle fermentation, whereby the springs, before decayed, are repaired and invigorated, and the tone and elasticity of the fibres of the vessels restored; the consequence of which is a more easy and brisk circulation.

CARDIALGIA, in medicine, a violent sensation of heat or acrimony felt towards the upper or left orifice of the stomach, though seemingly at the heart; sometimes accompanied with palpitations of the heart, fainting, and a propensity to vomit: better known by the name of *cardiac passion*, or *heart-burn*. See (*Index subjoined to*) MEDICINE.

CARDIFF, a town of Glamorganshire, in South Wales, seated on the river Tawe, in a rich and fruitful soil. It is a large, compact, well-built town, having a castle, a wall, and four gates, built by Robert Fitz-Hamon, a Norman, about the year 1100. It is governed by the constable of the castle, 12 aldermen, 12 burgesses, &c. and sends one member to parliament. Here the assizes and sessions are held, besides several courts. There is a handsome bridge over the river, to which small vessels come to take in their lading. It has now only one church, St Mary's having been long since thrown down by the undermining of the river. The castle, though much decayed, makes a grand appearance even at this time; and the walls of the town are very strong and thick. The church has a fine tower-skeele, and the town-hall is a good structure. The magistrates are elected every year by the majority of the burgesses. W. Long. 3. 20. N. Lat. 51. 30.

CARDIGAN, the capital town of Cardiganshire, in South Wales, is seated near the mouth of the river Teivy, on the Irish channel. It is indifferently large and well-built, containing three wards, one church, and the county-goal. It is governed by a mayor, 13 aldermen, 13 common-council-men, &c. Here are the ruins of a castle which was built by Gilbert de Clare, about the year 1160. It sends one member to parliament; and has two markets, held on Tuesdays and Saturdays. W. Long. 4. 38. N. Lat. 52. 15.

CARDIGANSHIRE, a county of South Wales, bounded on the north by Merionethshire and Montgomeryshire, on the east by Radnorshire and Brecknockshire, on the west by the Irish Sea, and on the south by Caermarthenshire. Its length from north-west

Cardiac
||
Cardigan-
shire.

Cardinal.

to south-east is about 44 miles, and its breadth near 20. The air, as in other parts of Wales, varies with the foil, which in the southern and western parts is more upon a level than this principality generally is, which renders the air mild and temperate. But as the northern and eastern parts are mountainous, they are consequently more barren and bleak. However, there are cattle bred in all parts; but they have neither wood nor coals of their own for fuel: they have rich lead mines, and fish in plenty, with fowls both tame and wild. The principal rivers are the Teivy, the Ridol, and the Iſtwith. This county hath five market-towns, *viz.* Cardigan, Aberistwith, Llanbadarnvawu, Llanbedar, and Tregaron, with 77 parishes; and was formerly computed to have upward of 3000 houses, and 520,000 acres of land. It sends two members to parliament; one for the county, and one for Cardigan.

CARDINAL, in a general sense, an appellation given to things on account of their pre-eminence; thus we say *cardinal virtues*, &c.

CARDINAL *Signs*, in the zodiac, are Aries, Libra, Cancer, and Capricorn.

CARDINAL *Points*, in cosmography, are the east, west, north, and south.

CARDINAL, an ecclesiastical prince in the Romish church, being one who has a voice in the conclave at the election of a pope. The cardinals were originally no more than deacons, to whom was intrusted the care of distributing the alms to the poor in the several quarters of Rome: and as they held assemblies of the poor in certain churches of their several districts, they took the title of these churches. They began to be called *cardinals* in the year 300, during the pontificate of St Sylvester, by which appellation was meant the chief priests of a parish, and next in dignity to a bishop. This office grew more considerable afterwards, and by small degrees arrived at its present height, in which it is the reward of such as have served his holiness well, even princes thinking it no diminution of their honour to become members of the college of cardinals.

The cardinals compose the pope's council, and till the time of Urban VIII. had the title of the *most illustrious*; but by a decree of that pope, in 1630, they had the title of *eminence* conferred on them.

At the creation of a new cardinal, the pope performs the ceremony of opening and shutting his mouth, which is done in a private confistory. The shutting his mouth implies the depriving him of the liberty of giving his opinion in congregations; and the opening his mouth, which is performed 15 days after, signifies the taking off this restraint. However, if the pope happens to die during the time a cardinal's mouth is shut, he can neither give his voice in the election of a new pope, nor be himself advanced to that dignity.

The cardinals are divided into six orders or classes, consisting of six bishops, 50 priests, and 14 deacons, making in all 70; which constitute the sacred college. The number of cardinal-bishops has very seldom been changed, but that of priests and deacons has varied at different times.

The privileges of cardinals are very great. They have an absolute power in the church during the vacancy of the holy see: they have a right to elect the new pope, and are the only persons on whom the election can fall:

most of the grand offices in the court of Rome are filled by cardinals. The dress of a cardinal is a red tunic, a rocket, a short purple mantle, and the red hat. When they are sent to the courts of Princes, it is in quality of legates *a latere*; and when they are appointed governors of towns, their government is called by the name of *legation*.

CARDINAL is also a title given to some bishops, as those of Mentz and Milan, to the archbishop of Bourges; and the abbot of Vendome calls himself *cardinalis natus*.

CARDINAL'S *Flower*. See RAPUNTUM.

CARDIOID, in the higher geometry, an algebraical curve, so called from its resemblance to an heart.

CARDIOSPERMUM, HEART-PEA; a genus of the trigynia order, belonging to the octandria class of plants. There are two species, both natives of the East and West Indies; but have no great beauty, or any other remarkable property.

CARDIUM, or COCKLE, in zoology, a genus of insects belonging to the order of vermes testacea. The shell consists of two equal valves, and the sides are equal. There are 21 species of this genus. Common on all sandy coasts, lodged a little beneath the sand; their place marked by a depressed spot. They are wholesome and delicious food.

CARDONA, a handsome town of Spain, in Catalonia, with a strong castle, and the title of a duchy. Near it is an inexhaustible mountain of salt of several colours, as red, white, carnation, and green: but when washed, it becomes white. There are also vineyards which produce excellent wine, and very lofty pine-trees. It is seated on an eminence, near the river Cardenero. E. Long. 1. 26. N. Lat. 41. 42.

CARDUUS, the THISTLE; a genus of the polygama æqualis order, belonging to the syngenesiæ class of plants. Of this genus there are 26 species, ten of which are natives of Britain, and being troublesome weeds require no description. Some few of the exotic kinds are propagated in gardens for the sake of variety; but even these have neither beauty nor any other property to recommend them.

CARDUUS *Benedictus*. See Cnicus.

CAREENING, in the sea-language, the bringing a ship to lie down on one side, in order to trim and caulk the other side. See Plate LXXXIV. fig. 2.

A ship is said to be brought to the careen, when the masts of her lading being taken out, she is hulled down on one side, by a small vessel, as low as necessary; and there kept by the weight of the ballast, ordnance, &c. as well as by ropes, lest her masts should be strained too much; in order that her sides and bottom may be trimmed, seams caulked, or any thing that is faulty under water mended. Hence when a ship lies on one side when the sails, she is said to fail on the careen.

CAREER, in the menage, a place inclosed with a barrier, wherein they run the ring.

The word is also used for the race or course of the horse itself, provided it do not exceed 200 paces.

In the ancient circus, the career was the space the bigæ, or quadrigæ, were to run at full speed, to gain the prize. See CIRCUS.

CAREER, in falconry, is a flight or tour of the bird, about 120 yards. If the mount more, it is called a *double career*; if less, a *semi-career*.

Cardinal
||
Crecer.

CARELIA, the eastern province of Finland; divided into Swedish Carelia, and Muscovite Carelia. The capital of the latter is Povenza, and of the former Weiburg.

CARELSCROON, a sea-port town of Sweden, in Blekingia, or Bleking, on the Baltic Sea, with a very good harbour, defended by two forts. It was built in 1679; and is very populous, with arsenals for the marine: the house of the director-general of the admiralty is in this town, and here the Swedes lay up their royal navy. E. Long. 15. 5. N. Lat. 56. 15.

CARENTAN, a town of France in Lower Normandy, and in the Contentin, with an ancient castle. W. Long. 1. 14. N. Lat. 49. 20.

CARET, among grammarians, a character marked thus A, signifying that something is added on the margin, or interlined, which ought to come in where the caret stands.

CAREW (George), born in Devonshire in 1557, an eminent commander in Ireland, was made president of Munster by queen Elizabeth; when, joining his forces with the earl of Thomond, he reduced the Irish insurgents, and brought the earl of Desmond to his trial. King James made him governor of Guernsey, and created him a baron. As he was a valiant commander, he was no less a polite scholar; and wrote *Pacata Hibernia*, a history of the late wars in Ireland, printed after his death, in 1633. He made several collections for a history of Henry V. which are digested into Speed's History of Great Britain. Besides these, he collected materials of Irish history in four large MSS. volumes, now in the Bodleian library, Oxford.

CAREW (Thomas), descended from the family of Carew in Gloucestershire, was gentleman of the privy chamber to Charles I. who always esteemed him one of the most celebrated wits of his court. He was much respected by the poets of his time, particularly by Ben Johnson, and Sir William Davenant; and left behind him several poems, and a masque called *Colum Britannicum*, performed at Whitehall on Shrove Tuesday night, 1633, by the king, and several of his nobles with their sons. Carew was assisted in the contrivance by Inigo Jones, and the music was set by Mr Henry Lawes of the king's chapel. He died in the prime of life, about the year 1639.

CARGADORS, a name which the Dutch give to those brokers whose business is to find freight for ships outward bound, and to give notice to the merchants, who have commodities to send by sea, of the ships that are ready to sail, and of the places for which they are bound.

CARGAPOL, or **KARGAPOL**, the capitol of a territory of the same name, in the province of Dwina, in Muscovy: E. Long. 36°. N. Lat. 63°.

CARGO denotes all the merchandises and effects which are laden on board a ship.

Super-CARGO, a person employed by merchants to go a voyage, oversee the cargo, and dispose of it to the best advantage.

CARIATI, a town of Italy, in the kingdom of Naples, and province of Hither Calabria, with a bishop's see, and the title of a principality. It is two miles from the gulph of Taranto, and 37 north-east of Cosenza. E. Long. 17. 19. N. Lat. 30. 38.

CARIBBEE ISLANDS, a cluster of islands situated

in the Atlantic ocean between 59 and 63 degrees of west longitude, and between 11 and 18 degrees of north latitude. They lie in the form of a bow or femicircle, stretching almost from the coast of Florida north, to near the river Oroonoque. Those that lie nearest the east have been called the *Windward Islands*, the others the *Leeward*, on account of the winds blowing generally from the eastern point in those quarters. Abbé Raynal conjectures them to be the tops of very high mountains formerly belonging to the continent, which have been changed into islands by some revolution that has laid the flat country under water. The direction of the Caribbee islands, beginning from Tobago, is nearly north and N. N. W. This direction is continued, forming a line somewhat curved towards the north-west, and ending at Antigua. In this place the line becomes at once curved; and, extending itself in a straight direction to the west and north-west, meets in its course with Porto-Rico, St Domingo, and Cuba, known by the name of the *Leeward Islands*, which are separated from each other by channels of various breadths. Some of these are six, others 15 or 20 leagues broad; but in all of them the soundings are from 100 to 120 or 150 fathom. Between Granada and St Vincent there is also a small archipelago of 30 leagues, in which the soundings are not above ten fathom. The mountains in the Caribbee islands run in the same direction as the islands themselves. The direction is so regular, that if we were to consider the tops of these mountains only, independent of their bases, they might be looked upon as a chain of hills belonging to the continent, of which Martinico would be the most northerly promontory. The springs of water which flow from the mountains in the Windward Islands, run all in the western parts of these islands. The whole eastern coast is without any running water. No springs come down there from the mountains: and indeed they would have there been useless; for after having run over a very short tract of land, and with great rapidity, they would have fallen into the sea. In Porto Rico, St Domingo, and Cuba, there are a few rivers that discharge themselves on the northern side, and whose sources rise in the mountains running from east to west, that is, thro' the whole length of these islands. From the other side of the mountains facing the south, where the sea, flowing with great impetuosity, leaves behind it marks of its inundations, several rivers flow down, the mouths of which are capable of receiving the largest ships. The soil of the Caribbees consists mostly of a layer of clay or gravel of different thickness; under which is a bed of stone or rock. The nature of some of those soils is better adapted to vegetables than others. In those places where the clay is drier and more friable, and mixes with the leaves and remains of plants, a layer of earth is formed of greater depth than where the clay is moister. The sand or gravel has different properties according to its peculiar nature; wherever it is less hard, less compact, and less porous, small pieces separate themselves from it, which, though dry, preserve a certain degree of coolness useful to vegetation. This soil is called in America, a *pumice-stone* soil. Wherever the clay and gravel do not go through such modifications, the soil becomes barren, as soon as the layer formed by the decomposition of the original plants is destroyed.

When the Europeans landed on the Caribbee islands, they

Caribbee.

they found them covered with large trees, connected as it were to one another by a species of creeping plant, which, rising up in the same manner as the ivy, wove itself around all the branches, and concealed them from sight. There was so great plenty of this plant, and it grew so thick, that it was impossible to penetrate into the woods before it was cut down. In these forests there were varieties of trees that were exceeding lofty, very straight, and without any excrescences or defects. The annual fall and breaking down of the leaves of those trees, and the decay of their trunks thro' length of time, formed a moist sediment upon the ground, and occasioned a most surprising degree of vegetation when the trees were rooted up. In whatever soil these trees grew, their roots were seldom two feet deep, and very often less, though they extended themselves on the surface in proportion to the weight they had to support. The trees that grew on the tops of mountains, or in steep places, were very hard. Their bark was smooth, and firmly fixed to the wood. Several of them hardly yielded to the sharpest instrument, and it was necessary to burn them in order to root them up. The valleys abounded with soft wood; and at the foot of these, an infinite variety of plants, some of which were used by the natives for food.—We need not here recount the particulars already mentioned under the article AMERICA, concerning the indolent and savage life of the inhabitants of these islands; nor give a detail of their reduction by the Spaniards and other European powers, which falls to be mentioned under the name of each particular island; but shall here only observe, that by a treaty concluded in January 1660, between the French and English, the Caribs were confined to the islands of St Vincents and Dominica, where all the scattered body of this people were united, and at that time did not exceed in number 6000 men.

As the Caribbee islands are all between the tropics, their inhabitants are exposed, allowing for the varieties resulting from difference of situation and soil, to a perpetual heat, which generally increases from the rising of the sun till an hour after noon, and then declines in proportion as the sun declines. The variations of the temperature of the air seem to depend rather on the wind than on the changes of the seasons. In those places where the wind does not blow, the air is excessively hot, and none but the easterly winds contribute to temper and refresh it: those that blow from the south and west, afford little relief; but they are much less frequent and less regular than that which blows from the east. The branches of the trees exposed to the influence of the latter are forced round towards the west: but their roots are stronger, and more extended under the ground, towards the east than towards the west; and hence they are easily thrown down by strong west winds or hurricanes from that quarter. The easterly wind is scarce felt in the Caribbee islands before 9 or 10 o'clock in the morning, increases in proportion as the sun rises above the horizon, and decreases as it declines. Towards the evening it ceases entirely to blow on the coasts, but not on the open sea. It has also been observed, that it blows with more force, and more regularity, in the dog-days than at any other time of the year.

The rain also contributes to the temperature of the Caribbee islands, though not equally in them all. In

Caribbee.

those places where the easterly wind meets with nothing to oppose its progress, it dispels the clouds as they begin to rise, and causes them to break either in the woods or upon the mountains. But whenever the storms are too violent, or the blowing of the easterly wind is interrupted by the changeable and temporary effect of the southerly and westerly ones, it then begins to rain. In the other Caribbee islands where this wind does not generally blow, the rains are so frequent and plentiful, especially in the winter season, which lasts from the middle of July to the middle of October, that, according to the most accurate observations, as much rain falls in one week as in our climates in a year. Instead of those mild refreshing showers which fall in the European climates, the rains of the Caribbee islands are torrents, the found of which might be mistaken for hail, were not that almost totally unknown under so burning a sky. These showers indeed refresh the air; but they occasion a dampness, the effects of which are not less disagreeable than fatal. The dead must be interred within a few hours after they have expired. Meat will not keep sweet above 24 hours. The fruits decay, whether they are gathered ripe or before their maturity. The bread must be made up into biscuits, to prevent its growing mouldy. Common wines turn sour, and iron turns rusty, in a day's time. The feeds can only be preserved by constant attention and care, till the proper season returns for sowing them. When the Caribbee islands were first discovered, the corn that was conveyed there for the support of the Europeans, was so soon damaged, that it became necessary to send it out in the ears. This necessary precaution so much enhanced the price of it, that few were able to purchase it. Flour was then substituted in lieu of corn; which lowered indeed the expences of transport, but had this inconvenience, that it was sooner damaged. It was imagined by a merchant, that if the flour were entirely separated from the bran, it would have the double advantage of being cheaper, and keeping longer. He caused it therefore to be sifted, and put the finest flour into strong casks, and beat it close together with iron hammers, till it became so close a body that the air could scarcely penetrate it. This method was found to answer the purpose; and if, by it, the flour cannot be preserved as long as in our dry and temperate climates, it may be kept for six months, a year, or longer, according to the degree of care taken in the preparation.

However troublesome these effects of the rain may be, it is attended with some others still more formidable; namely, frequent and dreadful earthquakes. These happening generally during the time or towards the end of the rainy season, and when the tides are highest, some ingenious naturalists have supposed that there might be a connection between them. The waters of the sky and of the sea undermine, dig up, and ravage the earth in several different ways. Among the various shocks to which the Caribbee islands are exposed from the fury of the boisterous ocean, there is one distinguished by the name of *raz de maree*, or *whirlpool*. It constantly happens, once, twice, or thrice, from July to October, and always on the western coasts, because it takes place after the time of the westerly or southerly winds, or while they blow. The waves, which at a distance seem to advance gently within 400 or 500 yards, suddenly swell against the shore, as if acted upon in an oblique

Caribbiana,
Carica.

Caricatura
||
Carinthia.

oblique direction by some superior force, and break with the greatest impetuosity. The ships which are then upon the coast, or in the roads beyond it, unable either to keep their anchors, or to put out to sea, are dashed to pieces against the land, and all on board most commonly perish. The hurricane is another terrible phenomenon in these islands, by which incredible damage is occasioned; but happily it occurs not often.

The produce of the Caribbee islands is exceedingly valuable to the Europeans, consisting of sugar, rum, molasses, indigo, &c. a particular account of which is given under the names of the respective islands as they occur in the order of the alphabet.

CARIBBIANA, or CARIBIANA, the north east coast of Terra Firma, in South America, otherwise called *New ANDALUSIA*.

CARICA, the PAPAW; a genus of the decandria order, belonging to the diccia class of plants.

Species. 1. The papaya rises with a thick, soft, herbaceous stem, to the height of 18 or 20 feet, naked till within two or three feet of the top. The leaves come out on every side, upon very long foot-stalks. Those which are situated undermost are almost horizontal, but those on the top are erect: these leaves in full grown plants are very large, and divided into many lobes deeply sinuated. The stem of the plant, and also the footstalks of the leaves, are hollow; and the whole abounds with a milky acid juice. The flowers of the male plant are produced from between the leaves, on the upper part of the plant. They have footstalks near two feet long; at the end of which the flowers stand in loose clusters, each having a separate short foot-stalk: these are of a pure white, and have an agreeable odour. The flowers of the female papaya also come out from between the leaves towards the upper part of the plant, upon very short footstalks, sitting close to the stem: they are large, and bell-shaped, composed of six petals, and are commonly yellow; when these fall away, the germen swells to a large fleshy fruit, of the size of a small melon. These fruits are of different forms: some angular, and compressed at both ends; others oval, or globular; and some pyramidal: the fruit also abounds with the same acid and milky juice as the plants.

2. The propopoa, differs from the other in having a branching stalk, the lobes of the leaves entire, the flower of a rose colour, and the fruit shaped like a pear.

Culture, &c. These plants being natives of hot countries, cannot be preserved in Britain unless constantly kept in a warm stove, which should be of a proper height to contain them. They are easily propagated by seeds, which are annually brought in plenty from the West Indies, though the seeds of the European plants ripen well. The seeds should be sown in a hot-bed early in the spring: when the plants are near two inches high, they should be removed into separate small pots, and each plunged into a hot-bed of tanners bark, carefully shading them from the sun till they have taken root; after which, they are to be treated in the same manner as other tender exotics. When they are removed into other pots, care must be taken as much as possible to preserve the ball of earth about them, because wherever their roots are laid bare they seldom survive. When they are grown to a large size, they make a noble appearance with their strong upright stems, garnished on every side near the top with large shining leaves,

spreading out near three feet all round the stem: the flowers of the male fruit coming out in clusters on every side, and the fruit of the female growing round the stalks between the leaves, are so different from any thing of European production, as well to entitle these plants to a place in the gardens of the curious. The fruit of the first species is by the inhabitants of the Caribbee islands eaten with pepper and sugar as melons, but is much inferior to a melon in its native country; but those which have ripened in Britain were delectable, the only use to which Mr Miller says he has known them put, was, when they were about half grown, to soak them in salt water to get out the acid juice, and then pickle them for onongos, to which they are a good substitute.

CARICATURA, in painting, denotes the concealment of real beauties, and the exaggeration of blemishes, but still so as to preserve a resemblance of the object.

CARICOUS, an epithet given to such tumours as resemble the figure of a fig. They are frequently found in the piles.

CARIES, the corruption or mortification of a bone. See (*the Index* subjoined to) MEDICINE.

CARIGNAN, a fortified town of Piedmont, situated on the river Po, about seven miles south of Turin. E. Long. 7. 25. N. Lat. 44. 30. It was taken in 1544, by the French; who demolished the fortifications, but spared the castle. It was also taken, and retaken, in 1691.

CARINOLA, an episcopal town of Italy, in the kingdom of Naples, and Terra di Lavoro. E. Long. 15. 5. N. Lat. 41. 15.

CARINTHIA, a duchy of Germany, in the circle of Austria, bounded by the archbishopric of Salzburg on the north, and by Carniola and the Venetian territories on the south, on the west by Tyrol, and on the east by Stiria. A part of this country was anciently called *Carnia*, and the inhabitants *Carni*; but the former afterwards obtained the name of *Carinthia*, and the latter *Carantani* or *Carinthi*. The air of this country is cold, and the soil in general mountainous and barren; but there are some fruitful dales and valleys in it, which produces wheat and other grain. The lakes, brooks, and rivers, which are very numerous, abound with fish; and the mountains yield lead and iron, and in many places are covered with woods. The river Drave, which runs across the country, is the most considerable in Carinthia. The inhabitants are partly descendants of the ancient Germans, and partly of the Slavonians or Wends. The states are constituted as in Austria, and their assemblies are held at Clagenfurt. The archbishop of Salzburg and the bishop of Bamberg have considerable territories in this country. Christianity was planted here in the 7th century. The only profession tolerated at present is the Roman catholic. The bishops are those of Gurk and Lavant, who are subject to the archbishop of Salzburg. This duchy was formerly a part of Bavaria. In the year 1282, the emperor Rodolph I. gave it to Maynard count of Tyrol, on condition, that, when his male issue failed, it should revert to the house of Austria; which happened in 1331. Carinthia has its particular governor, or *land-captain*, as he is called; and contributes annually, towards the expence of the military establishment, 637,695 florins. Only one regiment of foot is usually quartered in it.

CARIPI,

CARIPI, a kind of cavalry in the Turkish army. The caripi, to the number of about 1000, are not slaves, nor bred up in the seraglio, like the rest; but are generally Moors, or renegade Christians, who having followed adventures, being poor, and having their fortune to seek by their dexterity and courage, have arrived at the rank of horse-guards to the Grand Signior.

CARISBROOK-CASTLE, a castle situated in the middle of the Isle of Wight, where king Charles I. was imprisoned. W. Long. 1. 30. N. Lat. 50. 40.

CARISTO, an episcopal city of Greece, in the eastern part of the island of Negropont, near cape Loro. E. Long. 24. 15. N. Lat. 38. 6.

CARKE, denotes the 30th part of a SARPLAR of wool.

CARLETON (Sir Dudley), was born in Oxfordshire, 1573, and bred in Christ-church college. He went as secretary to Sir Ralph Winwood into the Low Countries, when king James resigned the cautionary towns to the States; and was afterwards employed for 20 years as ambassador to Venice, Savoy, and the United Provinces. King Charles created him viscount Dorchester, and appointed him one of his principal secretaries of state; in which office he died in 1631. He was esteemed a good statesman, though an honest man; and published several political works.

CARLINA, the **CARLINE THISTLE**; a genus of the polygamia aequalis order, belonging to the syngenesia class of plants. There are seven species, only one of which is a native of Britain, viz. the vulgaris. The others are natives of the south of France or Italy; and are very easily propagated in this country by seeds, which must be sown on a bed of fresh undunged earth, where they are to remain, as they do not bear transplanting. When the plants appear above ground, they should be carefully weeded, and afterwards thinned, leaving them about ten inches or a foot asunder. The second year most of them will flower: but, unless the season proves dry, they rarely produce good seeds in this country, and some of the plants decay soon after they have flowered, so that it is pretty difficult to maintain them here. The roots are used in medicine, and for that purpose are imported from those countries where the plants grow naturally. As we receive them they are about an inch thick, externally of a rusty brown colour, corroded as it were on the surface, and perforated with numerous small holes, appearing on the surface as if worm-eaten. They have a strong smell, and a subacrid, bitterish, weakly aromatic taste. They are looked upon to be warm alexipharmics and diaphoretics. Frederic Hoffman the Elder, relates that he has observed a decoction of them in broth to occasion vomiting. They have been for some time greatly esteemed among foreign physicians; but never were much in use in this country. The present practice has entirely rejected them, nor are they often to be met with in the shops.

CARLINE, or *Caroline*, a silver coin current in the Neapolitan dominions, and worth about 4d. of our money.

CARLINGFORD, a port-town of Ireland, seated on Carlingford bay, in the county of Louth, and province of Leinster, 22 miles north of Drogheda. W. Long. 6. 24. N. Lat. 24. 5.

CARLISLE, the capital city of the county of Cumberland, seated on the south of the river Eden, and be-

tween the Petterel on the east, and the Caude on the west. It is surrounded by a strong stone wall, and has a pretty large castle in the western part of it, as also a citadel in the eastern part, built by Henry VIII. It flourished in the time of the Romans, as appears from the antiquities that are to be met with here, and the Roman coins that have been dug up. At the departure of the Romans this city was ruined by the Scots and Picts; and was not rebuilt till the year 680, by Egfrid, who encompassed it with a wall, and repaired the church. In the 8th and 9th centuries, the whole country was again ruined, and the city laid desolate by the incursions of the Norwegians and Danes. In this condition it remained till the time of William Rufus; who repaired the walls and the castle, and caused the houses to be rebuilt. It was fortified by Henry I. as a barrier against Scotland; he also placed a garrison in it, and made it an episcopal see. It was twice taken by the Scots, and afterwards burnt accidentally in the reign of Richard II. The cathedral, the suburbs, and 1500 houses, were destroyed at that time. It is at present in a good condition; and has three gates, the English on the south, the Scotch on the north, and the Irish on the west. It has two parishes, and as many churches, St Cuthbert and St Mary's, the last of which is the cathedral, and is separated from the town by a wall of its own. The eastern part, which is the newest, is a curious piece of workmanship. The choir with the aisles is 71 feet broad; and has a stately east window 48 feet high and 30 broad, adorned with curious pillars. The roof is elegantly vaulted with wood; and is embellished with the arms of England and France quartered; as also with Piercy's, Lucy's, Warren's, Mowbray's, and many others. In the choir are the monuments of three bishops who are buried there. The west end was in part demolished in 1641, in the time of the civil wars. The Picts wall, which was built across the country from Newcastle, terminates near this place. Carlisle was taken by the rebels, Nov. 15, 1745; and was retaken by the duke of Cumberland, on the 10th of December following. It is governed by a mayor, twelve aldermen, two bailiffs, &c. and has a considerable market on Saturdays. The manufactures of Carlisle are chiefly of printed linens, for which near 3000*l.* per annum is paid in duties. It is also noted for a great manufacture of whips, in which a great number of children are employed.—Salmons appear in the Eden in numbers, so early as the months of December and January; and the London and even Newcastle markets are supplied with early fish from this river: but it is remarkable, that they do not visit the Elk in any quantity till April; notwithstanding the mouths of the two rivers are at a small distance from each other.

CARLOCK, in commerce, a sort of isinglass, made with the sturgeon's bladder, imported from Archangel. The chief use of it is for clarifying wine, but it is also used by the dyers. The best carlock comes from Altarcan, where a great quantity of sturgeon is caught.

CARLOSTAD, or **CARLSTAD**, a town of Sweden in Wermeland, seated on the lake Warmer, in E. Long. 14. 4. N. Lat. 59. 16.

CARLOSTAD, or *Carlstadt*, a town of Hungary, capital of Croatia, and the usual residence of the governors of the province. It is seated on the river Rulph, in E. Long. 16. 5. N. Lat. 45. 34.

Carlowitz
||
Carmelites.

CARLOWITZ, a small town of Hungary, in Sclavonia, remarkable for a peace concluded here between the Turks and Christians in 1669. It is seated on the west side of the Danube, in E. Long. 19. 5. N. Lat. 45. 25.

CARLSTADT, a town of Germany, in the circle of Franconia, and bishopric of Wurtzburg, seated on the river Maine, in E. Long. 9. 51. N. Lat. 50. 0.

CARMAGNIOLA, a fortified town of Italy, in Piedmont, with a good castle. It was taken by the French in 1691, and retaken by prince Eugene the same year. It is seated in a country abounding in corn, flax, and silk, near the river Po, in E. Long. 7. 32. N. Lat. 44. 43.

CARMEL, a high mountain of Palestine, standing on the skirts of the sea, and forming the most remarkable head-land on all that coast. It extends eastward from the sea as far as the plain of Jezreel, and from the city of that name quite to Cæsarea on the south. It seems to have had the name of *Carmel* from its great fertility; this word, according to the Hebrew import, signifying the *vine of God*, and is used in scripture to denote any fruitful spot, or any place planted with fruit-trees. This mountain, we are assured, was very fertile. Mr Sandys acquaints us, that, when well cultivated, it abounds with olives, vines, and variety of fruits and herbs both medicinal and aromatic. Others, however, represent it as rather dry and barren; which perhaps may have happened from the neglect of agriculture so common in all parts of the Turkish empire, especially where they are exposed to the incursions of the Arabs. Carmel is the name of the mountain, and of a city built on it; as well as of a heathen deity worshipped in it, but without either temple or statue: tho' anciently there must have been a temple, as we are told that this mountain was a favourite retreat of Pythagoras, who spent a good deal of time in the temple, without any person with him. But what hath rendered mount Carmel most celebrated and revered both by Jews and Christians, is its having been the residence of the prophet Elijah, who is supposed to have lived there in a cave, (which is there shown), before he was taken up into heaven.

CARMELITES, an order of religious, making one of the four tribes of mendicants or begging friars; and taking its name from mount Carmel, formerly inhabited by Elias, Elisha, and the children of the prophets; from whom this order pretends to descend in an uninterrupted succession. The manner in which they make out their antiquity has something in it too ridiculous to be rehearsed. Some among them pretend they are descendants of Jesus Christ; others go further, and make Pythagoras a Carmelite, and the ancient druids regular branches of their order. Phocas, a Greek monk, speaks the most reasonably. He says, that in his time, 1185, Elias's cave was still extant on the mountain; near which were the remains of a building which intimated that there had been anciently a monastery: that, some years before, an old monk, a priest of Calabria, by revelation, as he pretended, from the prophet Elias, fixed there, and assembled ten brothers.--In 1209, Albert, patriarch of Jerusalem, gave the solitaries a rigid rule, which Papebroch has since printed. In 1217, or, according to others, 1226, pope Honorius III. approved and conformed it. This rule con-

tained 16 articles; one of which confined them to their cells, and enjoined them to continue day and night in prayer; another prohibited the brethren having any property; another enjoined fasting from the feast of the holy cross till Easter, except on Sundays; abstinence at all times from flesh was enjoined by another article; one obliged them to manual labour; another imposed a strict silence on them from vespers till the tierce the next day.

The peace concluded by the emperor Frederic II. with the Saracens, in the year 1229, so disadvantageous to Christendom, and so beneficial to the infidels, occasioned the Carmelites to quit the Holy Land, under Alan the fifth general of the order. He first sent some of the religious to Cyprus, who landed there in the year 1238, and founded a monastery in the forest of Fortania. Some Sicilians, at the same time, leaving mount Carmel, returned to their own country, where they founded a monastery in the suburbs of Messina. Some English departed out of Syria, in the year 1240, to found others in England. Others of Provence, in the year 1244, founded a monastery in the desert of Aigualates, a league from Marceilles: and thus, the number of their monasteries increasing, they held their European general chapter in the year 1245, at their monastery of Aylesford in England.—This order is so much increased, that it has, at present, 38 provinces; besides the congregation of Mantua, in which are 54 monasteries, under a vicar-general; and the congregations of Barefooted Carmelites in Italy and Spain, which have their peculiar generals.

After the establishment of the Carmelites in Europe, their rule was in some respects altered; the first time, by pope Innocent IV. who added to the first article a precept of chastity, and relaxed the 11th which enjoins abstinence at all times from flesh, permitting them, when they travelled, to eat boiled flesh: this pope likewise gave them leave to eat in a common refectory, and to keep asses or mules for their use. Their rule was again mitigated by the popes Eugenius IV. and Pius II. Hence the order is divided into two branches, viz. the *Carmelites of the ancient observance*, called the *moderate or mitigated*; and those of the *strict observance*, who are the *barefooted Carmelites*; a reform set on foot in 1540, by S. Theresa, a nun of the convent of Avila, in Castile: these last are divided into two congregations, that of Spain, and that of Italy.

The habit of the Carmelites was at first white, and the cloak laced at the bottom with several lists. But pope Honorius IV. commanded them to change it for that of the Minims. Their capsculary is a small woollen habit of a brown colour, thrown over their shoulders. They wear no linen shirts; but instead of them lincsey-woolsey, which they change twice a-week in the summer, and once a-week in the winter.

If a monk of this order lies with a woman, he is prohibited saying mass for three or four years, is declared infamous, and obliged to discipline himself publicly once a-week. If he is again guilty of the same fault, his penance is doubled; and if a third time, he is expelled the order.

CARMEN, an ancient term among the Latins, used in a general sense to signify a verse; but more particularly to signify a spell, charm, form of expiation or exorcism, couched in a few words placed in a mystic or-

Carmelites,
Carmen.

Carmentalia der, on which its efficacy depended. Pezron derives the word *carmen* from the Celtic *carm*, the shout of joy, or the verses which the ancient bards sung to encourage the soldiers before the combat.—*Carmen* was anciently a denomination given also to precepts, laws, prayers, imprecations, and all solemn formula couched in a few words placed in a certain order, though written in prose. In which sense it was that the elder Cato wrote a *Carmen de moribus*, which was not in verse but in prose.

CARMENTALIA, a feast among the ancient Romans, celebrated annually upon the 11th of January, in honour of Carmenta, or Carmentis, a prophetess of Arcadia, mother of Evander, with whom she came into Italy 60 years before the Trojan war. The solemnity was also repeated on the 15th of January, which is marked in the old calendar by *Carmentalia relata*. This feast was established on occasion of a great fecundity among the Roman dames, after a general reconciliation with their husbands, with whom they had been at variance, in regard of the use of coaches being prohibited them by an edict of the senate. This feast was celebrated by the women: he who offered the sacrifices was called *sacerdos carmentalis*.

CARMINATIVES, medicines used in colics, or other flatulent disorders, to dispel the wind.

The word comes from the Latin *carninare*, to card or tease wool, and figuratively to attenuate and discuss wind or vapours, and promote their discharge by perspiration. Tho' Dr Quincey makes it more mysterious: He says it comes from the word *carmen*, taking it in the sense of an invocation or charm; and makes it to have been a general name for all medicines which operated like charms, *i. e.* in an extraordinary manner. Hence, as the most violent pains were frequently those arising from pent-up wind, which immediately cease upon dispersion; the term *carmine* became in a peculiar sense applied to medicines which gave relief in windy cases, as if they cured by enchantment: but this interpretation seems a little too far strained.

The action of carminatives may be somewhat understood by considering that all the parts of the body are perspirable. Sanctorius determines all that we call wind to be such perspirable matter as makes its escape through the coats of the stomach and intestines; between the several parts of the muscles also may be such perspirable matter: 'now whatever rarefies, and renders collections of these vapours thinner, conduces to their discharge; and as all those things of this denomination in medicine are warm, attenuant, and consist of light subtle parts, it is easy to understand how a mixture of them with the flatus may agitate and rarefy it, especially as they also create such agreeable sensations on the fibres, which help, by invigorating their tone, also to expel it.

CARMINE, a powder of a very beautiful red colour, bordering upon purple; and used by painters in miniature, though rarely on account of its great price. The manner of preparing it is kept a secret by the colour-makers; neither do any of those receipts which have for a long time been published concerning the preparation of this and other colours at all answer the purpose. See *COLOUR-Making*.

CARMONA, a town of Italy in Frioli; and in the county of Goritz, seated on a mountain near the river

Indri. It belongs to the house of Austria. E. Long. 5. 37. N. Lat. 46. 15.

CARMONA, an ancient town of Spain in Andalusia. The gate towards Seville is one of the most extraordinary pieces of antiquity in all Spain. It is seated in a fertile country, 15 miles east of Seville. W. Long. 5. 37. N. Lat. 37. 24.

CARNATION, in botany. See *DIANTHUS*.

CARNATION-Colour, among painters, is understood of all the parts of a picture, in general, which represent flesh, or which are naked and without drapery. Titian and Corregio in Italy, and Rubens and Vanduyke in Flanders, excelled in carnations.—In colouring for flesh, there is so great a variety, that it is hard to lay down any general rules for instruction therein; neither are there any regarded by those who have acquired a skill this way: the various colouring for carnations may be easily produced, by taking more or less red, blue, yellow, or bistre, whether for the first colouring, or for the finishing: the colour for women should be bluish, for children a little red, both fresh and gay; and for the men it should incline to yellow, especially if they are old.

CARNEADES, a celebrated Greek philosopher, was a native of Cyrene in Africa, and founder of the third academy. He was so fond of study, that he not only avoided all entertainments, but forgot even to eat at his own table; his maid-servant Melissa was obliged to put the victuals into his hand. He was an antagonist of the Stoics; and applied himself with great eagerness to refute the works of Chrysippus, one of the most celebrated philosophers of their sect. The power of his eloquence was dreaded even by a Roman senate. The Athenians being condemned by the Romans to pay a fine of 500 talents for plundering the city of Oropus, sent ambassadors to Rome, who got the fine mitigated to 100 talents. Carneades the academic, Diogenes the Stoic, and Critolaus the Peripatetic, were charged with this embassy. Before they had an audience of the senate, they harangued to great multitudes in different parts of the city. Carneades's eloquence was distinguished from that of the others by its strength and rapidity. Cato the elder made a motion in the senate, that these ambassadors should be immediately sent back, because it was very difficult to discern the truth 'trot the arguments of Carneades. The Athenian ambassadors (said many of the senators) were sent rather to force us to comply with their demands, than to solicit them by persuasion; meaning, that it was impossible to resist the power of that eloquence with which Carneades addressed himself to them. According to Plutarch, the youth at Rome were so charmed by the fine orations of this philosopher, that they forsook their exercises and other diversions, and were carried with a kind of madness to philosophy; the humour of philosophising spreading like enthusiasm. This grieved Cato, who was particularly afraid of the subtilty of wit and strength of argument with which Carneades maintained either side of a question. Carneades harangued in favour of justice one day, and the next day against it, to the admiration of all who heard him, among whom were Galba and Cato, the greatest orators of Rome. This was his element; he delighted in demolishing his own work; because he served in the end to confirm his grand principle, that there are only probabilities or resemblances

Carmona

Carneades.

Carnelian
||
Carniola.

of truth in the mind of man; so that of two things directly opposite, either may be chosen indifferently. Quintilian remarks, that though Carneades argued in favour of injustice, yet he himself acted according to the strict rules of justice. The following was a maxim of Carneades: "If a man privately knew that his enemy, or any other person whose death might be of advantage to him, would come to sit down on grass in which there lurked an asp, he ought to give him notice of it, though it were in the power of no person whatever to blame him for being silent." Carneades, according to some, lived to be 85 years old; others make him to be 90: his death is placed in the 4th year of the 162^d Olympiad.

CARNELIAN, in natural history, a precious stone, of which there are three kinds, distinguished by three colours, a red, a yellow, and a white. The red is very well known among us; is found in roundish or oval masses, much like our common pebbles; and is generally met with between an inch and two or three inches in diameter: it is of a fine, compact, and close texture; of a glossy surface; and, in the several specimens, is of all the degrees of red, from the palest flesh-colour to the deepest blood-red. It is generally free from spots, clouds, or variegations: but sometimes it is veined very beautifully with an extremely pale red, or with white; the veins forming concentric circles, or other less regular figures, about a nucleus, in the manner of those of agates. The pieces of carnelian which are all of one colour, and perfectly free from veins, are those which our jewellers generally make use of for seals, though the variegated ones are much more beautiful. The carnelian is tolerably hard, and capable of a very good polish: it is not at all affected by acid menstrua: the fire divests it of a part of its colour, and leaves it of a pale red; and a strong and long continued heat will reduce it to a pale dirty gray.

The finest carnelians are those of the East Indies; but there are very beautiful ones found in the rivers of Silesia and Bohemia; and we have some not despicable ones in England.

Though the ancients have recommended the carnelian as astringent, and attributed a number of fanciful virtues to it, we know of no other use of the stone than the cutting seals on it; to which purpose it is excellently adapted, as being not too hard for cutting, and yet hard enough not to be liable to accidents, to take a good polish, and to separate easily from the wax.

CARNERO, in geography, a name given to that part of the gulph of Venice, which extends from the western coast of Istria to the island of Grossa and the coast of Morlachia.

CARNERO is likewise the name of the cape to the west of the mouth of the bay of Gibraltar.

CARNIOLA, a duchy of Germany bounded on the south by the Adriatic sea, and that part of Istria possessed by the republic of Venice; on the north, by Carinthia and Stiria; on the east, by Slavonia and Croatia; on the west, by Friuli, the county of Gorz or Goritz, and a part of the gulph of Venice; extending in length about 10 miles, and in breadth about 50. It had its ancient name *Carnia*, as well as the modern one *Carniola*, from its ancient inhabitants the *Carni*, a tribe of Scythians, otherwise called *Japides*, whence

this and the adjacent countries were also called *Japidia*.

Carniola is full of mountains, some of which are cultivated and inhabited, some covered with wood, others naked and barren, and others continually buried in snow. The valleys are very fruitful. Here are likewise mines of iron, lead, and copper; but salt mull be had from the sovereign's magazines. There are several rivers, besides many medicinal springs and inland lakes. The common people are very hardy, going barefooted in winter through the snow, with open breasts, and sleeping on a hard bench without bed or bolster. Their food is also very coarse and mean. In winter, when the snow lies deep on the ground, the mountaineers bind either small baskets, or long thin narrow boards, like the Laplanders, to their feet, on which, with the help of a stout staff or pole, they descend with great velocity from the mountains. When the snow is frozen, they make use of a sort of irons or skais. In different parts of the country, the inhabitants, especially the common sort, differ greatly in their dress, language, and manner of living. In Upper and Lower Carniola they wear long beards. The languages chiefly in use are the Slavonian or Wendish, and German; the first by the commonalty, and the latter by people of fashion. The duchy is divided into the Upper, Lower, Middle, and Inner, Carniola. The principal commodities exported hence are iron, steel, lead, quicksilver, white and red wine, oil of olives, cattle, sheep, cheese, linen, and a kind of woollen stuff called *mahalan*, Spanish leather, honey, walnuts, and timber; together with all manner of wood-work, as boxes, dishes, &c.—Christianity was first planted here in the eighth century.—Lutheranism made a considerable progress in it; but, excepting the Walachians or Uskokes, who are of the Greek church, and style themselves *Staraverzi*, i. e. old believers, all the inhabitants at present are Roman Catholics. Carniola was long a marquise or margravate; but in the year 1231 was erected into a duchy. As its proportion towards the maintenance of the army, it pays annually 363,171 florins; but only two regiments of foot are quartered in it.

CARNIVAL, or CARNAVAL, a time of rejoicing, a season of mirth, observed with great solemnity by the Italians, particularly at Venice, holding from the twelfth-day till Lent.

The word is formed from the Italian *Carnavalle*; which Mr Du Cange derives from *Carn-a-val*, by reason the flesh then goes to pot, to make amends for the season of abstinence then ensuing. Accordingly, in the corrupt Latin, he observes, it was called *Carnelovenum*, and *Carnisprivium*; as the Spaniards still denominate it *carnes tollendas*.

Fests, balls, operas, concerts of music, intrigues, marriages, &c. are chiefly held in carnival-time. The carnival begins at Venice the second holiday in Christmasts: Then it is they begin to wear masks, and open their play-houses and gaming-houses; the place of St Mark is filled with mountebanks, jack-puddings, pedlars, whores, and such like mob, who flock thither from all parts. There have been no less than seven sovereign princes and 30,000 foreigners here to partake of these diversions.

CARNIVOROUS, an epithet applied to those animals which naturally seek and feed on flesh.

Carniola
||
Carnivoro.

It has been a dispute among naturalists, whether man is naturally carnivorous. Those who take the negative side of the question, insist chiefly on the structure of our teeth, which are mostly incisores or molares; not such as *carnivorous* animals are furnished with, and which are proper to tear flesh in pieces: to which it may be added, that, even when we do feed on flesh, it is not without a preparatory alteration by boiling, roasting, &c. and even then, that it is the hardest of digestion of all foods. To these arguments Dr Wallis subjoins another; which is, that all quadrupeds which feed on herbs or plants, have a long colon, with a cæcum at the upper end of it, or somewhat equivalent, which conveys the food by a long and large progress, from the stomach downwards, in order to its slower passage and longer stay in the intestines; but that, in *carnivorous* animals, such cæcum is wanting, and instead thereof there is a more short and slender gut, and a quicker passage through the intestines. Now, in man, the cæcum is very visible: a strong presumption that nature, who is still consistent with herself, did not intend him for a *carnivorous* animal.—It is true, the cæcum is but small in adults, and seems of little or no use; but in a fetus it is much larger in proportion: And it is probable, our customary change of diet, as we grow up, may occasion this shrinking. But to these arguments, Dr Tyson replies, that if man had been by nature designed not to be *carnivorous*, there would doubtless have been found, somewhere on the globe, people who do not feed on flesh; which is not the case. Neither are carnivorous animals always without a colon and cæcum; nor are all animals carnivorous which have those parts: the opossum, for instance, hath both a colon and cæcum, and yet feeds on poultry and other flesh; whereas the hedge-hog, which has neither colon nor cæcum, and so ought to be carnivorous, feeds only on vegetables. Add to this, that hogs, which have both, will feed upon flesh when they can get it; and rats and mice, which have large cæcums, will feed on bacon as well as bread and cheese. Lastly, the human race are furnished with teeth necessary for the preparation of all kinds of foods; from whence it would seem, that nature intended we should live on all. And as the alimentary duct in the human body is fitted for digesting all kinds of food, ought we not rather to conclude, that nature did not intend to deny us any?

It is no less disputed, whether mankind were *carnivorous* before the flood. St Jerom, Chrysostom, Theodoret, and other ancients, maintain, that all animal food was then forbidden; which opinion is also strenuously supported among the moderns by Curcellæus, and refuted by Heidegger, Danzius, Bockhart, &c.

CARO (Annibal), a celebrated Italian poet, was born at Civita Nuovo in 1507. He became secretary to the duke of Parma, and afterwards to Cardinal Farnese. He was also made a knight of Malta. He translated Virgil's *Æneid* into his own language with such propriety and elegance of expression, that he was allowed by the best judges, to have equalled the original. He also translated Aristotle's rhetoric; two oratorios of Gregory Nazianzen, with a discourse of Cyprian. He wrote a comedy; and a miscellany

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of his poems was printed at Venice in 1584. He died at Rome in 1566.

Carolina.

CAROLINA, a province of North America, comprehending the most westerly part of Florida, and lying between 29 and 36-degrees of N. Lat. It is bounded on the east by the Atlantic, and on the west by the Pacific ocean, on the north by Virginia, and on the south by the remaining part of Florida.

This country is seated between the extremities of heat and cold, though the heat is more troublesome in summer than the cold in winter; their winters being very short, and the frosty mornings frequently succeeded by warm days. The air is generally serene and clear the greatest part of the year; but in February and March, the inhabitants have a custom of burning the woods, which causes such a smoke as to strangers would seem to proceed from a fog or thick-ness in the air. The smoke of the tar-kilns likewise deceives strangers, and gives them an ill opinion of the air of Carolina; to which also conduces a custom of the Indians of setting fire to the woods in their huntings, for many miles round. The great rains are in winter, though they are not without heavy showers at midsummer; add to these the constant dews that fall in the night, which refresh the ground and supply the plants with moisture. In North Carolina, the north-west winds in the winter occasion very pinching weather; but they are not of long continuance. Westerly winds bring very pleasant weather; but the southerly are hot and unwholesome, occasioning fevers and other disorders. But this must be understood of summer, for in winter they are very comfortable. The depth of winter is towards the latter end of February, and then the ice is not strong enough to bear a man's weight. In August and September, there are sometimes great storms and squalls of wind, which are so violent as to make lanes of 100 feet wide, more or less, through the woods, tearing up the trees by the roots. These storms generally happen once in about seven years; and are attended with dreadful thunder, lightning, and heavy rains. They commonly happen about the time of the hurricanes which rage so fatally among the islands between the tropics; and seem to be occasioned by them, or to proceed from the same cause: but by the time they reach Carolina, their force is much abated; and the farther north they proceed, so much the more do they decrease in fury. The soil on the coast is sandy; but farther up, the country is so fruitful, that they have not yet been at the trouble to manure their land. The grains most cultivated are Indian corn and rice, though any sort will thrive well enough; they have also pulse of several sorts, little known in England. All kinds of garden stuff usual in England are cultivated here, and may be had in great plenty. They export large quantities yearly of rice, pitch, tar, turpentine, deer-skins, and timber for building; cyprès, cedar, sassafras, oak, walnut, and pine. Besides these they also send out beef, pork, tallow, hides, furs, wheat, peas, potatoes, honey, bees-wax, myrtle-wax, tobacco, snake-root, cotton, several sorts of gums and medicinal drugs. Indigo is also cultivated in this province, but of an inferior quality to that which comes from the Caribbee islands. It hath been attempted

Carolina. in vain to cultivate vines, and produce silk, in this country; for though the frosts here do not continue long without intervals of warmer weather, they are sufficient to check the growth of the vine, as well as olives, dates, oranges, &c. The furs are bought of the Indians with vermilion, lead, gunpowder, coarse cloth, iron, and spirituous liquors. As yet they have not a sufficient number of handicraftsmen; which renders labour very dear, and a supply of cloaths from Europe necessary. The aspect of the country is very fine, being adorned with beautiful rivers and creeks, and the woods with lofty timber, which afford delightful and pleasant seats for the planters, and render the fencing their lands very easy. And as they have plenty of fish, wild-fowl, and venison, besides other necessaries which this country produces naturally, they live easy and luxuriously. The planters and their families that are born here, are troubled with few distempers; and are generally tall, well-made, and active. The women who are not exposed to the weather are remarkably fair and handsome, with fine eyes. They marry at thirteen or fourteen; and where there is no clergyman, the ceremony is performed by a justice of the peace. They are very fruitful, have easy labours, and the children at nine months old are able to run about the house. Both sexes, as well young as old, are very dextrous in paddling and managing the canoes, being bred to it from their infancy. The religion of the planters is that of the church of England; but, as there is liberty of conscience, here are dissenters of all sorts.—The most substantial people build their houses with brick and lime made with oyster-shells; for there is no stone except near the mountains. The meaner sort make theirs with rough boards, and cover them with shingles. Their diet, except Indian corn, differs little from ours; and they import several sorts of strong liquors. Besides which they have cyder, perfimon, and cedar-beer, of their own. They have likewise a beer made with molasses, wheat-bran and hops, which is very good. There are mines of pit-coal in this country; but they have such plenty of wood for firing, that there is no occasion to work them.

Their rivers are large, and navigable a great many miles up the country. They rise near the mountains, and abound with delicate fish, besides water-fowl of different kinds. In some there are islands which yield good pasture, without the annoyance of wild beasts. The chief mountains are the Cherokee or Allegany mountains, which are situated north and north-west, five or six hundred miles distant from the sea. They are very high; and abound with trees, plants, stones, and minerals, of different kinds. The inhabitants chiefly make use of paper-money among themselves.

The most common diseases are agues, cachexies, fluxes, the yaws, colicks, convulsions, the hooping-cough, tetters, the prickly heat, and the itch.

The Indians, like those in other parts, are well made, of a red copper colour, with black hair, and the whites of their eyes streaked with red. They have no beard nor hair on any part of the body but the head*. Those that are clothed and brought up among the planters, have their skins of a bright reddish colour; but those that go naked are more dusky,

from a custom of daubing themselves with bear's grease. However, by painting themselves with roucou, they appear more red than they naturally would be. They use other colours on different occasions. They generally go stark naked, except a few who have been taught to be a little more modest. They are great smokers, and good marksmen; and will walk on the ridge of a house without fear or danger of falling.

This country is divided into North and South Carolina, and Georgia; each of which is under a particular governor. The North is subdivided into four counties, Granville, Colleton, Berkley, and Craven; and South Carolina into two, Clarendon and Albemarle. This last is also divided into fourteen parishes or townships, each of which has a brick or timber church. The former likewise has the same number of parishes. Charlestown is the capital of the whole country.

Carolina was discovered by Sebastian Cabot, about the year 1500, in the reign of Henry VII. but the settling of it being neglected by the English, a colony of French Protestants, by the encouragement of Admiral Coligni, were transported thither; and named the place of their first settlement *Aux Carolina*, in honour of their prince, Charles IX. of France: but in a short time that colony was destroyed by the Spaniards; and no other attempt was made by any European power to settle there till the year 1664, when 800 English landed at Cape-Fear in North Carolina, and took possession of the country. In 1670 Charles II. of Britain granted Carolina to the Lords Berkley, Clarendon, Albemarle, Craven and Ashley, Sir George Carteret, Sir William Berkley, and Sir John Colleton. The plan of government for this new colony was drawn up by the famous Mr Locke, who very wisely proposed an universal toleration in religious matters. The only restriction in this respect was, that every person claiming the protection of that settlement, should, at the age of 17, register himself in some particular communion. To civil liberty, however, our philosopher was not so favourable; the code of Carolina gave to the eight proprietors who founded the colony, and to their heirs, not only all the rights of a monarch, but all the powers of a legislation. The court, which was composed of this sovereign body, and called the *Palatine Court*, was invested with the right of nominating to all employments and dignities, and even of conferring nobility; but with new and unprecedented titles. They were, for instance, to create in each county two *caciques*, each of whom was to be possessed of 24,000 acres of land; and a *landgrave*, who was to have 80,000. The persons on whom these honours should be bestowed were to compose the upper house, and their possessions were made unalienable. They had only the right of farming or letting out a third part of them at the most for three lives. The lower house was composed of the deputies from the several counties and towns. The number of this representative body was to be increased as the colony grew more populous. No tenant was to pay more than about a shilling *per acre*, and even this rent was redeemable. All the inhabitants, however, both slaves and

* See *American*, n° 29.

Carolina
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Carp.

and freemen, were under an obligation to take up arms upon the first order from the Palatine court.

It was not long before the defects of this constitution became apparent. The proprietary lords used every endeavour to establish an arbitrary government; and, on the other hand, the colonists exerted themselves with great zeal to avoid servitude. In consequence of this struggle, the whole province, distracted with tumults and dissensions, became incapable of making any progress, though great things had been expected from its particular advantages of situation. Tho' a toleration in religious matters was a part of the original constitution, dissensions arose likewise on that account. In 1705, Carteret, now Lord Granville, who, as the oldest of the proprietors, was sole governor of the colony, formed a design of obliging all the non-conformists to embrace the ceremonies of the Church of England; and this act of violence, though disavowed and rejected by the mother-country, inflamed the minds of the people. In 1720, while this animosity was still subsisting, the province was attacked by several bands of savages, driven to despair by a continued course of the most atrocious violence and injustice. These unfortunate wretches were all put to the sword; but, in 1728, the lords proprietors having refused to contribute towards the expences of an expedition, of which they were to share the immediate benefits, were deprived of their prerogative, except Lord Granville, who still retained his eighth part. The rest received a recompence of about 24,000 l. The colony was taken under the immediate protection of the crown, and from that time began to flourish. The division into North and South Carolina now took place, and the settlement of Georgia commenced in 1732. See GEORGIA.

CAROLINE-books, the name of four books, composed by order of Charlemagne, to refute the second council of Nice. These books are couched in very harsh and severe terms, containing 120 heads of accusation against the council of Nice, and condemning the worship of images.

CAROLUS, an ancient English broad piece of gold, struck under Charles I. Its value has of late been at 23 shillings Sterling, though at the time it was coined it is said to have been rated at 20 Shillings.

CAROLUS, a small copper coin, with a little silver mixed with it, struck under Charles VIII. of France. The carolus was worth 12 deniers, when it ceased to be current. Those which are still current in trade in Lorrain, or in some neighbouring provinces, go under the name of French sols.

CAROTIDS, in anatomy, two arteries of the neck, which convey the blood from the aorta to the brain; one called the *right*, and the other the *left*, Carotid.

CARP, in ichthyology, the English name of a species of cyprinus. See CYPRINUS; also *Carp-Fishing*.

The carp is the most valuable of all kinds of fish for stocking of ponds. It is very quick in its growth, and brings forth the spawn three times a-year, so that the increase is very great. The female does not begin to breed till eight or nine years old; so that in breeding-ponds a supply must be kept of carp of that age. The best judges allow, that, in stocking a breeding-pond, four males should be allowed to twelve

females. The usual growth of a carp is two or three inches in length in a year; but, in ponds which receive the fattening of common sewers, they have been known to grow from five inches to 18 in one year. A feeding-pond of one acre extent will very well feed 300 carp of three years old, 200 of two years, and 400 of one year old. Carp delight greatly in ponds that have marley sides; they love also clay-ponds well sheltered from the winds, and grown with weeds and long grafs at the edges, which they feed on in the hot months. Carp and tench thrive very fast in ponds and rivers near the sea, where the water is a little brackish; but they are not so well tasted as those which live in fresh water. Grains, blood, chickens-guts, and the like, may at times be thrown into carp-ponds, to help to fatten the fish. To make them grow large and fat, the growth of grafs under the water should by all means possible be encouraged. For this purpose, as the water decreases in the summer, the sides of the pond left naked and dry should be well raked with an iron rake, to destroy all the weeds, and cut up the surface of the earth: hay-seed should then be sown plentifully in these places; and more ground prepared in the same manner, as the water falls more and more away. By this means there will be a fine and plentiful growth of young grafs along the sides of the pond to the water's edge; and when the rains fill up the pond again, this will be all buried under the water, and will make a feeding-place for the fish, where they will come early in the morning, and will fatten greatly upon what they find there.

CARPEA, a kind of dance anciently in use among the Athenians and Magnesians, performed by two persons, the one acting a labourer, the other a robber. The labourer, laying by his arms, goes to ploughing and sowing, still looking warily about him as if afraid of being surpris'd: the robber at length appears, and the labourer, quitting his plough, betakes himself to his arms, and fights in defence of his oxen. The whole was performed to the sound of flutes, and in cadence. Sometimes the robber was overcome, and sometimes the labourer; the victor's reward being the oxen and plough. The design of the exercise was to teach and accustom the peasants to defend themselves against the attacks of ruffians.

CARPENTER, a person who practises CARPENTRY.

CARPENTER of a Ship, an officer appointed to examine and keep in order the frame of a ship, together with her masts, yards, boats, and all other wooden machinery. It is his duty in particular to keep the ship *tight*; for which purpose he ought frequently to review the decks and sides, and to caulk them when it is necessary. In the time of battle, he is to examine up and down, with all possible attention, in the lower apartments of the ship, to stop any holes that may have been made by shot, with wooden plugs provided of several sizes.

CARPENTRAS, an episcopal town of Provence in France, and capital of Venaissin. It is subject to the Pope; and is seated on the river Anson, at the foot of a mountain. E. Long. 5. 6. N. Lat. 44. 4.

CARPENTRY, the art of cutting, framing, and
10 B 2 joining

Carp
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Carpentry.

Carpentum joining large pieces of wood, for the uses of building. It is one of the arts subservient to architecture, and is divided into house-carpentry and ship-carpentry: the first is employed in raising roofing, flooring of houses, &c. and the second in the building of ships*, barges, &c. The rules in carpentry are much the same with those of JOINERY; the only difference is, that carpentry is used in the larger and coarser-work, and joinery in the smaller and curious.

* See Ship-building.

CARPENTUM, in antiquity, a name common to divers sorts of vehicles, answering to coaches as well as waggons, or even carts, among us. The Carpentum was originally a kind of car or vehicle in which the Roman ladies were carried; though in after times it was also used in war. Some derive the word from *carro*; others from *Carmenta* the mother of Evander, by a conversion of the *m* into *p*.

CARPET, a sort of covering of stuff, or other materials, wrought with the needle or on a loom, which is part of the furniture of a house, and commonly spread over tables, or laid upon the floor.

Persian and Turkey carpets are those most esteemed; though at Paris there is a manufactory after the manner of Persia, where they make them little inferior, not to say finer than the true Persian carpets. They are velvety, and perfectly imitate the carpets which come from the Levant.—There are also carpets of Germany, some of which are made of woolen stuffs, as felices, &c. and called square carpets: others are made of wool also, but wrought with the needle, and pretty often embellished with silk; and, lastly, there are some made of dogs hair. We have likewise carpets made in Britain, which are used either as floor-carpets, or to cover chairs, &c. It is true, we are not arrived at the like perfection in this manufacture with our neighbours the French; but may not this be owing to the want of a like public encouragement?

CARPI, a principality of Modena in Italy, lying about four leagues from that city. It formerly belonged to the house of Pio; the elder sons of which bore the title of *Princes of St Gregory*. In the beginning of the 14th century *Manfred* was the first prince of Carpi; but in the 16th, the Emperor Charles V. gave the principality to Alfonso Duke of Ferrara. This nobleman, in recompence, gave to Albert Pio, to whom the principality of Carpi belonged of right, the town of Sassuolo and some other lands. Albert was, however, at last obliged to retire to Paris; where, being tripped of all his estates, he died in 1538, with the reputation of being one of the best and bravest men of his age. The family of Pio is yet in being, and continues attached to the French Court. Some of them have even been raised to the purple, and still make a figure in Europe.

CARPI, a town of Italy in the duchy of Modena, and capital of the last mentioned principality. It has a strong castle, and is situated in E. Long. 11. 12. N. Lat. 44. 45.

CARPI, a town of the Veronese in Italy, memorable for a victory gained by the Imperialists over the French in 1701. It is subject to the Venetians; and is situated on the river Adige, in E. Long. 11. 39. N. Lat. 45. 10.

CARPINUS, the HORN-BEAM; a genus of the Polyandra order, belonging to the Monœcia class of plants. There are four species, of which only one is a native of Britain, and this is the only one that merits notice. It loves a poor stiff soil on the sides of hills, is easily transplanted, and bears lopping. Cattle eat the leaves, but pasturage will not flourish under its shade. The wood burns like a candle, is very white, tough, harder than hawthorn, and capable of supporting a great weight. It is useful in turning, and for making many implements in husbandry. It makes cogs for mill-wheels, even superior to yew. The inner bark is much used in Scandinavia to dye yellow. In Britain, the trees will grow to a large size, but are rarely suffered to do so; and of late years this tree has been considered only as a shrub, and never cultivated but for underwood in the country, and in the nurseries to form hedges after the French manner.

CARPOBALSAM, in the *Materia Medica*, the fruit of the tree which yields the true oriental balsam. The Carpopallum is used in Egypt, according to Prosper Alpinus, in all the intentions in which the balsam itself is applied: but the only use the Europeans make of it, is in Venice-treacle and Mithridate; and in these not a great deal, for cubebs and juniper-berries are generally substituted in its place.

CARPOCRATIANS, a branch of the ancient Gnostics, so called from *Carpocrates*, who in the second century revived and improved upon the errors of Simon Magus, Menander, Saturninus, and other Gnostics. He owned, with them, one sole principle and father of all things, whose name as well as nature was unknown. The world, he taught, was created by angels, vastly inferior to the first principle. He opposed the divinity of Jesus Christ; making him a mere man, begotten carnally on the body of Mary by Joseph, though possessed of uncommon gifts which set him above other creatures. He inculcated a community of women; and taught, that the soul could not be purified, till it had committed all kinds of abominations, making that a necessary condition of perfection.

CARPUS, the wrist. See ANATOMY, n° 53.

CARR, a kind of rolling throne, used in triumphs, and at the splendid entries of princes. See CHARIOT. The word is from the ancient Gaulish, or Celtic, *Carr*; mentioned by Cæsar, in his commentaries, under the name *Carrus*. Plutarch relates, that Camillus having entered Rome in triumph, mounted on a *carr* drawn by four white horses, it was looked on as too haughty an innovation.

CARR, is also used for a kind of light open chariot. The *carr*, on medals, drawn either by horses, lions or elephants, usually signifies either a triumph or an apotheosis; sometimes a procession of the images of the gods at a solemn supplication, and sometimes of those of some illustrious family at a funeral.—The *carr* covered, and drawn by mules, only signifies a *consecration*, and the honour done any one of having his image carried at the games of the Circus. See CONSECRATION, &c.

CARRIAGE, a vehicle serving to convey persons, goods, merchandizes, and other things, from one place to another.

Carpinus
1 Carriage.

Carriage
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Carrier.

For the construction and mechanical principles of wheel-carriages. See *MECHANICS*, n° 59.

CARRIAGE of a Cannon, the frame or timber-work on which it is mounted, serving to point it for shooting, or to carry it from one place to another. It is made of two planks of wood, commonly of one-half the length of the gun, called the cheeks, and joined by three wooden transoms, strengthened with three bolts of iron. It is mounted on two wheels, but on a march has two fore-wheels with limbers added. The principal parts of a carriage are the cheeks, transoms, bolts, plates, train, bands, bridge, bed, hooks, trunnion-holes and capsquare.

Block-CARRIAGE, a cart made on purpose for carrying mortars and their beds from place to place.

Truck-CARRIAGE, two short planks of wood, supported on two axle-trees, having four trucks of solid wood for carrying mortars or guns upon battery, where their own carriages cannot go. They are drawn by men. *■*

CARRAVEIRA, a town of Turkey in Europe, with a Greek archbishop's see. E. Long. 22. 25. N. Lat. 40. 27.

CARRICK, the southern division of the shire of Ayr in Scotland. It borders on Galloway; stretches 32 miles in length; and is a hilly country fit for pasturage. The chief rivers are the Stencher and Girven, both abounding with salmon; here are also several lakes and forests; and the people on the coast employ themselves in the herring-fishery, though they have no harbour of any consequence. The only towns of this district are Bargeny and Maybole, two inconsiderable villages, yet the first gives the title of Baron to a branch of the Hamilton Family.

CARRICK on the Sure, a town of Ireland, in the county of Tipperary and province of Munster. W. Long. 7. 14. N. Lat. 52. 16.

CARRICK-Fergus, a town of Ireland, in the county of Antrim and province of Ulster; it is a borough and market-town, very rich and populous, with a good harbour and cattle, and sends two members to parliament. It is seated on the Irish channel, on a bay of the same name.

CARRIER, is a person that carries goods for others for hire. A common carrier having the charge and carriage of goods, is to answer for the same, or the value, to the owner. And where goods are delivered to a carrier, and he is robbed of them, he shall be charged and answer for them, because of the hire. If a common carrier who is offered his hire, and who has convenience, refuses to carry goods, he is liable to an action, in the same manner as an inn-keeper who refuses to entertain a guest. See *ASSUMPSIT*.

One brought a box to a carrier, with a large sum of money, and the carrier demanded of the owner what was in it; he answered, that it was filled with silks, and such like goods: upon which, the carrier took it and was robbed, and adjudged to make it good; but a special acceptance, as, *provided there is no charge of money*, would have excused the carrier.—A person delivered to a carrier's book-keeper two bags of money sealed up, to be carried from London to Exeter, and told him that it was *£. 200*, and took his receipt for

the same, with promise of delivery for *10s. per cent.* carriage and risk: though it be proved that there was *£. 400* in the bags, if the carrier be robbed, he shall answer only for *£. 200*, because there was a particular undertaking for that sum and no more; and his reward, which makes him answerable, extends no farther. If a common carrier loses goods which he is intrusted to carry, a special action on the case lies against him, on the custom of the realm, and not trover; and so of a common carrier by boat. An action will lie against a porter, carrier, or barge-man, upon his bare receipt of the goods, if they are lost through negligence. Also a lighter-man spoiling goods he is to carry, by letting water come to them, action of the case lies against him, on the common custom.

CARRIER-Pigeon, a sort of pigeon used, when properly trained, to be sent with letters from one place to another. See *COLUMBA*.

Though you carry these birds hood-winked, 20, 30, nay, 60 or 100 miles, they will find their way in a very little time to the place where they were bred. They are trained to this service in Turkey and Persia; and are carried first, while young, short flights of half a mile, afterwards more, till at length they will return from the farthest part of the kingdom. Every Bashaw has a basket of these pigeons bred in the *scraglio*, which, upon any emergent occasion, as an insurrection, or the like, he dispatches, with letters braced under their wings, to the *seraglio*; which proves a more speedy method, as well as a more safe one, than any other; he sends out more than one pigeon, however, for fear of accidents. Lithgow assures us, that one of these birds will carry a letter from Babylon to Aleppo, which is 30 days journey, in 48 hours. This is also a very ancient practice; Hirtius and Brutus, at the siege of Modena, held a correspondence with one another by means of pigeons. And Ovid tells us, that Taurilothenes, by a pigeon stained with purple, gave notice to his father of his victory at the Olympic Games, sending it to him at *Ægina*.

CARRON, a small but remarkable river in Scotland, rising about the middle of the isthmus between the firths of Forth and Clyde. Both its source, and the place where it emptieth itself into the sea, are within the shire of Stirling, which it divides into two nearly equal parts. The whole length of its course, which is from west to east, is not above 14 miles. It falls into the firth of Forth about three miles to the north-east of Falkirk. The stream thereof is but small, and scarce deserves the notice of a traveller; yet there is no river in Scotland, and few in the whole island of Britain, whose banks have been the scene of so many memorable transactions. When the Roman empire was in all its glory, and had its eastern frontiers upon the Euphrates, the banks of Carron were its boundaries upon the north-west; for the wall of Antoninus*, which was raised to mark the limits of that mighty empire, stood in the neighbourhood of this river, and ran parallel to it for several miles.

Near the middle of its course, in a pleasant valley, stand two beautiful mounts, called the *Hills of Dunipace*, which are taken notice of by most of the Scottish historians as monuments of great antiquity. The whole

Carrier
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Carron.

Justices
Law-Dict.

* See Antoninus's Wall.

Carron.

whole structure of these mounds is of earth; but they are not both of the same form and dimensions. The more easterly one is perfectly round, resembling an oven, and about fifty feet in height: And that this is an artificial work does not admit of the least doubt; but we cannot affirm the same, with equal certainty, of the other, though it has been generally supposed to be so too. It bears no resemblance to the eastern one either in shape or size. At the foundation it is nearly of a triangular form; but the superstructure is quite irregular; nor does the height thereof bear any proportion to the extent of its base. These mounds are now planted with firs, which, with the parish-church of Dunipace standing in the middle between them, and the river running hard by, give this valley a very romantic appearance. The common account given of these mounds is, that they were erected as monuments of a peace concluded in that place between the Romans and the Caledonians, and that their name partakes of the language of both people; *Dun* signifying a hill in the old language of this island, and *lax* "peace" in the language of Rome. The compound word, *Dunipace*, signifies "the hills of peace." And we find in history, that no less than three treaties of peace were, at different periods, entered into between the Romans and Caledonians; the first, by Severus, about the year 210; the second, soon after, by his son Caracalla; and the third, by the usurper Carausius, about the year 280; but of which of those treaties Dunipace is a monument, we do not pretend to determine. If the concurring testimony of historians and antiquaries did not agree in giving this original to these mounds, we would be tempted to conjecture that they are sepulchral monuments. Human bones and urns have been discovered in earthen fabrics of this kind in many parts of this island, and the little mounds or barrows, which are scattered in great numbers about Stonehenge in Salisbury plain are generally supposed to have been the sepulchres of the ancient Britons. See BARROWS.

From the valley of Dunipace, the river runs for some time in a deep and hollow channel, with steep banks on both sides: here it passes by the foundations of the ancient Roman bridge; not far from which, as is generally thought, was the scene of the memorable conference betwixt the Scottish patriot William Wallace, and Robert Bruce, father to the king of that name, which first opened the eyes of the latter to a just view, both of his own true interest, and that of his country.

After the river has left the village and bridge of Larbert, it soon comes up to another small valley, through the midst of which it has now worn out to itself a straight channel; whereas, in former ages, it had taken a considerable compass, as appears by the tract of the old bed, which is still visible. The high and circling banks upon the south-side, give to this valley the appearance of a spacious bay; and, according to the tradition of the country, there was once an harbour here: nor does the tradition seem altogether groundless; pieces of broken anchors have been found here, and some of them within the memory of people yet alive. The stream-tides would still flow near the place, if they were not kept back

Carron.

by the dam-head built across the river at Stenhouse; and there is reason to believe, that the frith flowed considerably higher in former ages than it does at present. In the near neighbourhood of this valley, upon the south, stand the ruins of ancient Camelon; which, after it was abandoned by the Romans, was probably inhabited, for some ages, by the natives of the country.

Another ancient monument, called Arthur's Oven, once stood upon the banks of Carron; but was, with a spirit truly Gothic, entirely demolished about thirty years ago. The corner of a small inclosure between Stenhouse and the Carron iron-works, is pointed out as the place of its situation. This is generally supposed to have been a Roman work; though it is not easy to conceive what could be their motive for erecting such a fabric, at so great a distance from any other of their works, and in a spot which, at that time, must have been very remote and unfrequented. The form of it is said to have been perfectly round, and rising perpendicular for some yards at first, but afterwards gradually contracted, till it terminated in a narrow orifice at the top. Antiquaries are not agreed whether it had been a temple, or a trophy, or a mausoleum; but the most common opinion is, that it had been a temple, and, Buchanan thinks, a temple of Terminus. Hector Boetius says, that there were benches of stone all around it, upon the inside; and that there had been a large stone for sacrificing upon, or an altar, upon the south side.

As Carron extends over the half of the isthmus, and runs so near the ancient boundaries of the Roman empire, the adjacent country fell naturally to be the scene of many battles and encounters. Historians mention a bloody battle fought near this river between the Romans and the confederate army of the Scots and Picts in the beginning of the 5th century. The scenes of some of Ossian's poems were, in the opinion of the translator, upon the banks of this river. Here Fingal fought with Caracul, the son of the king of the world, supposed to have been the same with Caracalla the son of the Roman emperor Severus. Here also young Oscar, the son of Ossian, performed some of his heroic exploits. Hereabout was the stream of Crona, celebrated in the ancient compositions of the Gallic bard; possibly that now called the water of Bonny, which runs in the neighbourhood of the Roman wall, and discharges itself into Carron at Dunipace. In those poems, mention is made of a green vale upon the banks of this river, with a tomb standing in the middle of it, where young Oscar's party and the warriors of Carus met. We only take notice of this as it strengthens the conjecture hazarded above, that the mounds of Dunipace, especially the more easterly of them, were sepulchral monuments.—About the distance of half a mile from the river, and near the town of Falkirk, lies the field of that battle which was fought by William Wallace and the English in the beginning of the 14th century. It goes by the name of *Graham's muir*, from the valiant John Graham, who fell there, and whose grave-stone is still to be seen in the churchyard of Falkirk.

The river Carron, though it hath long since ceased to

to

Carron
Cars.Seother-
dale Canal.

to roll its stream amidst the din of arms, still preserves its fame, by lending its aid to trade and manufactures; (see the next article).—The river is navigable for some miles near its mouth, and a considerable trade is carried on upon it by small craft; for the convenience of which, its channel has of late years been straightened and much shortened, and the great Canal* has its entrance from it.

CARRON-Works, a large iron-foundry, two miles north from Falkirk in Scotland. They are conveniently situated on the banks of the Carron, three miles above its entry into the frith of Forth. Above 100 acres of land have been converted into reservoirs and pools, for water diverted from the river, by magnificent dams built about two miles above the works, which, after turning eighteen large wheels for the several purposes of the manufacture, falls into a tide-navigation that conveys their callings to the sea.

These works are the greatest of the kind in Europe, and were established in 1760. At present, the buildings are of vast extent; and the machinery, constructed by Mr Smeaton, is the first in Britain, both in elegance and correctness: there are 1600 men employed, to whom is paid weekly 650*l.* Sterling; which has greatly enriched the adjoining country: 6500 tons of iron are melted annually from the mineral with pit-coal, and cast into cannon, cylinders, &c.—In the founding of cannon, these works have lately arrived at such perfection, that they make above 5000 pieces a year, many of which are exported to foreign states; and their guns of *new construction* are the lightest and neatest now in use, not excepting brass guns; the 32 pounder ship-gun weighing 42 hundred-weight, the 6 pounder 8 hundred-weight and one half, and the other calibers in proportion.

The present proprietors are a chartered Company, with a capital of 150,000*l.* Sterling, a common seal, &c. but their stock is confined to a very few individuals.

CARROT, in Botany. See **DAUCUS**.

Deadly-CARROT. See **THAPSIA**.

CARROUSAL, a course of horses and chariots, or a magnificent entertainment exhibited by princes on some public rejoicing. It consists in a cavalcade of several gentlemen, richly dressed and equipped after the manner of ancient cavaliers, divided into squadrons, meeting in some public place, and practising jousts, tournaments, &c. The last carrouzals were in the reign of Lewis XIV.

CARS, or **KARS**, a considerable and strong town of Asia, in Armenia, seated on a river of the same name; with a castle almost impregnable. E. Long. 43. 50. N. Lat. 41. 30.

CARSE, or **Carse of Gowry**, a district of Perthshire in Scotland. It lies on the north side of the Tay, and extends 14 miles in length from Dundee to Perth, and is from two to four in breadth. It is a rich plain country, cultivated like a garden, and producing as good harvests of wheat as any in Great Britain. It abounds with all the necessaries of life; but from its low damp situation, the inhabitants are subject to agues, and the commonalty are in great want of firing. In this district, not far from the Tay, stands the house of

Carstairs.

Errol, which formerly belonged to the Earls of that name, the chiefs of the ancient family of Hay, hereditary countesses of Scotland.

CARSTAIRS (William), an eminent Scots Divine, whose merit and good fortune called him to act in great scenes, and to associate with men, to whose society and intercourse his birth gave him few pretensions to aspire. A small village, in the neighbourhood of Glasgow, was the place of his nativity. His father, of whom little is known, exercised the functions of a clergyman.

Young Carstairs turned his thoughts to the profession of theology; and the persecutions and oppressions of government, both in regard to civil and religious liberty, having excited his strongest indignation, it became a matter of prudence that he should prosecute his studies in a foreign university. He went accordingly to Utrecht; and his industry and attention being directed with skill, opened up and unfolded those faculties, which he was about to employ with equal honour to his country and to himself.

During his residence abroad, he became acquainted with Pensionary Fagel, and entered with warmth into the interest of the Prince of Orange. On his return to Scotland to procure a license to teach doctrines which he had studied with the greatest care, he became disgusted with the proud and insolent conduct of Archbishop Sharp, and prepared to revisit Holland; where he knew that religious liberty was respected, and where he hoped he might better his condition by the connections he had formed.

His expectations were not vain. His prudence, his reserve, and his political address, were strong recommendations of him to the Prince of Orange, whose ambition and policy were to triumph over the obstinate bigotry of the Duke of York. The enemies of popery in England were numerous and powerful; and they had entered into a scheme for the exclusion of the Duke from the throne. To forward this scheme, Carstairs engaged in transactions of equal danger and importance. Secrets of high moment were intrusted to him. He entered into correspondence with personages of distinguished rank. He was employed in personal negotiations in Holland, England, and Scotland.

When the rupture between the Prince of Orange and the Duke of York came to extremity, Carstairs attended the former in his expedition to England, and was constantly consulted by him in all affairs of delicacy and moment. The Duke, irresolute and feeble in proportion as his situation was interesting and difficult, fled from a people who had begun to sympathize with his misfortunes, and from a crown which his posterity perhaps might yet have enjoyed if he had behaved with resolution. The man, whom the celebrated Turenne had extolled for courage and military sagacity, discovered the most shameful pusillanimity. The Prince of Orange was received by a great nation as its deliverer from civil and religious oppression.

The elevation of his master promised great advantage to Carstairs. He was appointed the King's chaplain for Scotland, and employed in settling the affairs of that kingdom. William, who carried politics into religion, was solicitous that episcopacy should prevail

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Carte.

Carte
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Cartes.

vail there as univerfally as in England. Carftairs, more verfant in the affairs of his native country, faw all the impropriety of this project, and the danger that would arife from the enforcing of it. His reasonings, his remonftrances, his intreaties, overcame the firmnefs of King William. He yielded to confiderations founded alike in policy and in prudence; and to Carftairs, Scotland is indebted for the full eftablifhment of its church in the prefbyterian form of government.

The death of King William was a fevere affliction to him; and it happened before that Prince had provided for him with the liberality he deferved. He was continued, however, in the office of chaplain for Scotland, by Queen Anne; and he was invited to accept the Principality of the Univerfity of Edinburgh. Placed at the head of the church, he profecuted its interefts with zeal and with integrity. Nor was his influence and activity confined to matters of religion. They were exerted with fuccefs in promoting the culture of the arts and fciences. The univerfities of Scotland owe him obligations of the higheft kind. He procured, in particular, an augmentation of the falaries of their profefors; a circumftance to which may be afcribed their reputation, as it enabled them to cultivate with fpirit the different branches of knowledge.

A zeal for truth, a love of moderation and order, prudence and humanity, diftinguifhed Principal Carftairs in an uncommon degree. His religion had no mixture of aufterity; his fecular tranfactions were attended with no imputation of artifice; and the verfatility of his talents made him pals with eafe from a court to a college.—This excellent perfon died in 1715; and in 1774 his *ftate-papers and letters*, with an account of his life, were publifhed in one vol. 4^{to} by the Rev. Dr McCormick.

CARSUGHI (Rainier), a Jefuit, born at Citerina in Tufcany, in 1647, was the author of a Latin poem, entitled, *Ar bene feribendi*, which is efteemed both for the elegance of the ftile, and for the excellent precepts it contains. He alfo wrote fome good epigrams. He died in 1709.

CARTAMA, a town of Spain in the kingdom of Granada, formerly very confiderable. It is feated at the foot of a mountain, near the river Guadala-Medina, in W. Long. 4. 28. N. Lat. 36. 40.

CART, a land-carriage with two wheels, drawn commonly by horfes, to carry heavy goods, &c. from one place to another. See MECHANICS, n^o 59.

CART-BoTE, in law, fignifies wood to be employed in making and repairing inftruments of husbandry.

CARTE (Thomas) the hiftorian, was the fon of Mr Samuel Carte, prebendary of Litchfield, and born in 1686. When he was reader in the abbey-church at Bath, he took occafion, in a 30th of January fermen, 1714, to vindicate Charles I. with refpect to the Irish maffacre, which drew him into a controverfy with Mr Chandler the diffenting minifter; and on the acceffion of the prefent royal family he refufed to take the oaths to government, and put on a lay habit. He is faid to have acted as a kind of fecretary to Bifhop Atterbury before his troubles; and in the year 1722, being accufed of high treafon, a reward of 1000*l*. was offered for apprehending him: but Queen Caroline, the great patronefs of learned

men, obtained leave for him to return home in fecurity. He publifhed, 1. An edition of Thuanus, in feven volumes folio. 2. The life of the firft Duke of Ormond, three volumes, folio. 3. The hiftory of England, four volumes folio. 4. A Collection of original letters and papers concerning the affairs of England, two volumes octavo; and fome other works. He died in April 1754.—His hiftory of England ends in 1654. His defign was to have brought it down to the Revolution; for which purpofe he had taken great pains in copying every thing valuable that could be met with in England, Scotland, France, Ireland, &c.—He had, (as he himfelf fays, p. 43. of his vindication of a full anfwer to a letter from a by-ftander,) “ read abundance of collections relating to the time of King Charles II. and had in his power a feries of memoirs from the beginning to the end of that reign; in which all thofe intrigues and turns at court, at the latter end of that king’s life, which Bifhop Burnet, with all his goit for tales of fecret hiftory, and all his genius for conjectures, does not pretend to account for, are laid open in the cleareft and moft convincing manner; by the perfon who was moft affected by them, and had the beft reafon to know them.”—At his death, all his papers came into the hands of his widow, who afterwards married Mr Jernegan, a member of the church of Rome.

CARTE-Blanche, a fort of white paper, figned at the bottom with a perfon’s name, and fometimes alfo fealed with his feal, giving another perfon power to fuperfcribe what conditions he pleafes. Much like this, is the French *blanc figne*, a paper without writing, except a fignature at the bottom, given by contending parties to arbitrators or friends, to fill up with the conditions they judge reafonable, in order to end the difference.

CARTEL, an agreement between two ftates for the exchange of their prifoners of war.

CARTEL, fignifies alfo a letter of defiance, or a challenge to decide a controverfy either in a tournament or in a fingle combat. See DUEL.

CARTEL-Ship, a fhip commiffioned, in time of war, to exchange the prifoners of any two hostile powers; alfo to carry any particular request or propofal from one to another: for this reafon, the officer who commands her is particularly ordered to carry no cargo, ammunition, or implements of war, except a fingle gun for the purpofe of firing fignals.

CARTES (Rene des), defcended of an ancient family in Touraine in France, was one of the moft eminent philofophers and mathematicians in the 17th century. At the Jefuits College at la Fleche, he made a very great progrefs in the learned languages and polite literature, and became acquainted with Father Marfenne. His father defigned him for the army; but his tender conftitution then not permitting him to expofe himfelf to fuch fatigues, he was fent to Paris, where he lunched into gaming, in which he had prodigious fuccefs. Here Marfenne perfuaded him to return to ftudy; which he perfued till he went to Holland, in May 1616, where he engaged as a volunteer among the prince of Orange’s troops. While he lay in garrifon at Breda, he wrote a *treatife on mufic*, and laid the foundation of feveral of his works. He

Cartes
Cartesians.

was at the siege of Rochelle in 1628; returned to Paris; and, a few days after his return, at an assembly of men of learning in the house of Monsignor Bagni the Pope's Nuncio, was prevailed upon to explain his sentiments with regard to philosophy, when the nuncio urged him to publish his system. Upon this he went to Amsterdam, and from thence to Franeker, where he began his *metaphysical meditations*, and drew up his *discourse on meteors*. He made a short tour to England; and not far from London, made some observations concerning the declination of the magnet. He returned to Holland, where he finished his *treatise on the world*.

His books made a great noise in France; and Holland thought of nothing but discarding the old philosophy, and following his. Voetius being chosen rector of the university of Utrecht, procured his philosophy to be prohibited, and wrote against him; but he immediately published a vindication of himself. In 1647, he took a journey into France, where the king settled a pension of 3000 livres upon him. Christina, queen of Sweden, having invited him into that kingdom, he went thither, where he was received with the greatest civility by her Majesty, who engaged him to attend her every morning at 5 o'clock, to instruct her in philosophy, and desired him to revise and digest all his writings which were unpublished, and to form a complete body of philosophy from them. She likewise proposed to allow him a revenue, and to form an academy of which he was to be the director. But these designs were broken off by his death in 1650. His body was interred at Stockholm, and 17 years afterwards removed to Paris, where a magnificent monument was erected to him in the church of St Genevieve du Mont. The great Dr Halley, in a paper concerning optics, observes, that though some of the ancients mention refraction as an effect of transparent mediums, Des Cartes was the first who discovered the laws of refraction, and reduced dioptrics to a science. As to his philosophy, Dr Keil, in his introduction to his examination of Dr Burnet's theory of the earth, says, that Des Cartes was so far from applying geometry to natural philosophy, that his whole system is one continued blunder on account of his negligence in that point; the laws observed by the planets in their revolutions round the sun, not agreeing with his theory of vortices. His philosophy has accordingly given way to the more accurate discoveries and demonstrations of the Newtonian system.

CARTESIANS, a sect of philosophers, who adhered to the system of Des Cartes, founded on the two following principles, the one metaphysical, the other physical. The metaphysical one is, *I think, therefore I am*; the physical principle is, that *nothing exists but substance*. Substance he makes of two kinds; the one a substance that thinks, the other a substance extended; whence actual thought, and actual extension, are the essence of substance.

The essence of matter being thus fixed in extension, the Cartesians conclude that there is no vacuum, nor any possibility thereof in nature; but that the universe is absolutely full: mere space is excluded by this principle; because, extension being implied in

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the idea of space, matter is so too. Upon these principles, the Cartesians explained mechanically how the world was formed, and how the present celestial phenomena came to take place. See ASTRONOMY, n° 77.

CARTHAGE, a famed city of antiquity, the capital of Africa Propria; and which, for many years, disputed with Rome the sovereignty of the world. According to Velleius Paterculus, this city was built 65, according to Justin and Trogus 72, according to others 100 or 140 years before the foundations of Rome were laid. It is on all hands agreed that the Phœnicians were the founders.

The beginning of the Carthaginian history, like that of all other nations, is obscure and uncertain. In the 7th year of Pygmalion king of Tyre, his sister Elifa, or Dido, is said to have fled, with some of her companions and vassals, from the cruelty and avarice of her brother Sichæus.

She first touched at the island of Cyprus, where she met with a priest of Jupiter, who was desirous of attending her; to which she readily consented, and fixed the priesthood in his family. At that time, it was a custom in the island of Cyprus, for the young women to go on certain stated days, before marriage, to the sea-side, there to look for strangers, that might possibly arrive on their coasts, in order to prostitute themselves for gain, that they might thereby acquire a dowry. Out of these, the Tyrians selected 80, whom they carried along with them. From Cyprus they sailed directly for the coast of Africa; and at last safely landed in the province called *Africa Propria*, not far from Utica, a Phœnician city of great antiquity. The inhabitants received their countrymen with great demonstrations of joy, and invited them to settle among them. The common fable is, that the Phœnicians imposed upon the Africans in the following manner: they desired, for their intended settlement, only as much ground as an ox's hide would encompass. This request the Africans laughed at; but were surprised, when, upon their granting it, they saw Elifa cut the hide into the smallest shreds, by which means it surrounded a large territory; in which she built the citadel called *Byrsa*. The learned, however, are now unanimous in exploding this fable; and it is certain that the Carthaginians for many years paid an annual tribute to the Africans for the ground they possessed.

The new city soon became populous and flourishing, by the accession of the neighbouring Africans, who came thither at first with a view of traffic. In a short time it became so considerable, that *Jarbas*, a neighbouring prince, thought of making himself master of it without any effusion of blood. In order to this, he desired that an embassy of ten of the most noble Carthaginians might be sent him; and, upon their arrival, proposed to them a marriage with Dido, threatening war in case of a refusal. The ambassadors, being afraid to deliver this message, told the queen that Jarbas desired some person might be sent him who was capable of civilizing his Africans; but that there was no possibility of finding any of her subjects who would leave his relations for the conversation of such barbarians. For this they were reprimanded by the queen; who told them that they ought to be ashamed

Carthage.

When founded.

2
Elifa, or Dido, escapes from her brother.

3
Builds the citadel Byrsa.

Carthage- of refusing to live in any manner for the benefit of their country. Upon this, they informed her of the true nature of their message from Jarbas; and that, according to her own decision, she ought to sacrifice herself for the good of her country. The unhappy queen, rather than submit to be the wife of such a barbarian, caused a funeral pile to be erected, and put an end to her life with a dagger.

4
She kills herself.

This is Justin's account of the death of Queen Dido, and is the most probable; Virgil's story of her amour with Æneas, being looked upon as fabulous, even in the days of Macrobius, as we are informed by that historian. How long monarchical government continued in Carthage, or what happened to this state in its infancy, we are altogether ignorant, by reason of the Punic Archives being destroyed by the Romans; so that there is a chasm in the Carthaginian history for above 300 years. It, however, appears, that, from the very beginning, the Carthaginians applied themselves to maritime affairs, and were formidable by sea in the time of Cyrus and Cambyfes. From Diodorus Siculus and Justin, it appears, that the principal support of the Carthaginians were the mines of Spain, in which country they seem to have established themselves very early. By means of the riches drawn from these mines, they were enabled to equip such formidable fleets as we are told they fitted out in the time of Cyrus or Cambyfes. Justin insinuates, that the first Carthaginian settlement in Spain happened when the city of Gades, now Cadiz, was but of late standing, or even in its infancy. The Spaniards finding this new colony begin to flourish, attacked it with a numerous army, inasmuch that the inhabitants were obliged to call in the Carthaginians to their aid. The latter very readily granted their request, and not only repulsed the Spaniards, but made themselves masters of almost the whole province in which their new city stood. By this success, they were encouraged to attempt the conquest of the whole country; but having to do with very warlike nations, they could not push their conquests to any great length at first; and it appears from the accounts of Livy and Polybius, that the greatest part of Spain remained unsubdued till the times of Hamilcar, Asdrubal, and Hannibal.

6
First treaty between Carthage and Rome.

About 503 years before the birth of Christ, the Carthaginians entered into a treaty with the Romans. It related chiefly to matters of navigation and commerce. From it we learn, that the whole island of Sardinia, and part of Sicily, were then subject to Carthage; that they were very well acquainted with the coasts of Italy, and had made some attempts upon them before this time; and that, even at this early period, a spirit of jealousy had taken place between the two republics. Some time near this period, the Carthaginians had a mind to discontinue the tribute they had hitherto paid the Africans for the ground on which their city stood. But, notwithstanding all their power, they were at present unsuccessful; and at last were obliged to conclude a peace, one of the articles of which was, that the tribute should be continued.

7
Sicily invaded by the Carthaginians.

By degrees the Carthaginians extended their power over all the islands in the Mediterranean, Sicily

excepted; and for the entire conquest of this, they made vast preparations, about 480 years before Christ. Their army consisted of 300,000 men; their fleet was composed of upwards of 2000 men of war, and 3000 transports; and with such an immense armament, they made no doubt of conquering the whole island in a single campaign. In this, however, they found themselves miserably deceived. Hamilcar their general having landed his numerous forces, invested Himera, a city of considerable importance. He carried on his attacks with the greatest assiduity; but was at last attacked in his trenches by Gelon and Theron, the tyrants of Syracuse and Agrigentum, who gave the Carthaginians one of the greatest overthrows mentioned in history. An hundred and fifty thousand were killed in the battle and pursuit, and all the rest taken prisoners; so that of 10 mighty an army, not a single person escaped. Of the 2000 ships of war, and 3000 transports, of which the Carthaginian fleet consisted, eight ships only, which then happened to be out at sea, made their escape: these immediately set sail for Carthage; but were all cast away, and every soul perished, except a few who were saved in a small boat, and at last reached Carthage with the dismal news of the total loss of the fleet and army. No words can express the consternation of the Carthaginians upon receiving the news of so terrible a disaster. Ambassadors were immediately dispatched to Sicily, with orders to conclude a peace upon any terms. They put to sea without delay; and landing at Syracuse, threw themselves at the conqueror's feet. They begged Gelon, with many tears, to receive their city into favour, and grant them a peace on whatever terms he should chuse to prescribe. He granted their request upon condition that Carthage should pay him 2000 talents of silver to defray the expences of the war; that they should build two temples, where the articles of the treaty should be lodged and kept as sacred; and that for the future they should abstain from human sacrifices. This was not thought a dear purchase of a peace for which there was such occasion; and to show their gratitude for Gelon's moderation, the Carthaginians complimented his wife Demarata with a crown of gold worth 100 talents.

From this time we find little mention of the Carthaginians for 70 years. Some time during this period, however, they had greatly extended their dominions in Africa, and likewise shaken off the tribute which gave them so much uneasiness. They had warm disputes with the inhabitants of Cyrene the capital of Cyrenaica, about a regulation of the limits of their respective territories. The consequence of these disputes was a war, which reduced both nations so low, that they agreed first to a cessation of arms, and then to a peace. At last it was agreed, that each state should appoint two commissioners, who should set out from their respective cities on the same day, and that the spot on which they met should be the boundary of both states. In consequence of this, two brothers called *Philiten* were sent out from Carthage, who advanced with great celerity, while those from Cyrene were much more slow in their motions. Whether this proceeded from accident, or design, or perfidy,

Carthage.

8
They are utterly destroyed.

9
Peace concluded.

10
Dispute with the Cyrenians.

11
Story of the *Philiten*.

Carthage. perfidy, we are not certainly informed; but, be this as it will, the Cyreneans finding themselves greatly outstripped by the Philani, accused them of breach of faith, asserting that they had set out before the time appointed, and consequently that the convention between their principals was broken. The Philani desired them to propose some expedient whereby their differences might be accommodated; promising to submit to it whatever it might be. The Cyreneans then proposed, either that the Philani should retire from the place where they were, or that they should be buried alive upon the spot. With this last condition the brothers immediately complied, and by their death gained a large extent of territory to their country. The Carthaginians ever after celebrated this as a most brave and heroic action; paid them divine honours; and endeavoured to immortalize their names by erecting two altars there, with suitable inscriptions upon them.

12 Sicily invaded anew. About the year before Christ 412, some disputes happening between the Egestines and Selinuntines, inhabitants of two cities in Sicily, the former called in the Carthaginians to their assistance; and this occasioned a new invasion of Sicily by that nation. Great preparations were made for this war; Hannibal, whom they had appointed general, was empowered to raise an army equal to the undertaking, and equip a suitable fleet. They also appointed certain funds for defraying all the expenses of the war, intending to exert their whole force to reduce the island under their subjection.

13 Emporium and Selinus taken. The Carthaginian general having landed his forces, immediately marched for Selinus. In his way he took Emporium, a town situated on the river Mazara; and having arrived at Selinus, he immediately invested it. The besieged made a very vigorous defence; but at last the city was taken by storm, and the inhabitants were treated with the utmost cruelty. All were massacred by the savage conquerors, except the women who fled to the temples; and these escaped, not through the merciful disposition of the Carthaginians, but because they were afraid, that if driven to despair they would set fire to the temples, and by that means consume the treasure they expected to find in those places. Sixteen thousand were massacred; 2250 escaped to Agrigentum; and the women and children, about 5000 in number, were carried away captives. At the same time the temples were plundered, and the city raised to the ground.

14 As likewise Himera. After the reduction of Selinus, Hannibal laid siege to Himera; that city he desired above all things to become master of, that he might revenge the death of his grandfather Hamilcar, who had been slain before it by Gelon. His troops, flushed with their late success, behaved with undaunted courage; but finding his battering engines not to answer his purpose sufficiently, he undermined the wall, supporting it with large beams of timber, to which he afterwards set fire, and thus laid great part of it flat on the ground. Notwithstanding this advantage, however, the Carthaginians were several times repulsed with great slaughter; but at last they became masters of the place, and treated it in the same manner as they

had done Selinus. After this, Hannibal, dismissing his Sicilian and Italian allies, returned to Africa.

Carthage. The Carthaginians were now so much elated, that they meditated the reduction of the whole island. But as the age and infirmities of Hannibal rendered him incapable of commanding the forces alone, they joined in commission with him Imilcar the son of Hanno, one of the same family. On the landing of the Carthaginian army, all Sicily was alarmed, and the principal cities put themselves into the best state of defence they were able. The Carthaginians immediately marched to Agrigentum, and began to batter the walls with great fury. The besieged, however, defended themselves with incredible resolution, in a sally burnt all the machines raised against their city, and repulsed the enemy with great slaughter. The Syracusians in the mean time, being alarmed at the danger of Agrigentum, sent an army to its relief. On their approach they were immediately attacked by the Carthaginians; but after a sharp dispute the latter were defeated, and forced to fly to the very walls of Agrigentum, with the loss of 6000 men. Had the Agrigentine commanders now sallied out, and fallen upon the fugitives, in all probability the Carthaginian army must have been destroyed; but, either through fear or corruption, they refused to stir out of the place, and this occasioned the loss of it. Immenſe booty was found in the city; and the Carthaginians behaved with their usual cruelty, putting all the inhabitants to the sword, not excepting even those who had fled to the temples.

The next attempt of the Carthaginians was designed against the city of Gela: but the Geleans, being greatly alarmed, implored the protection of Syracuse; and, at their request, Dionysius was sent to assist them with 2000 foot and 400 horse. The Geleans were so well satisfied with his conduct, that they treated him with the highest marks of distinction; they even sent ambassadors to Syracuse to return thanks for the important services done them by sending him thither; and soon after he was appointed generalissimo of the Syracusan forces and those of their allies against the Carthaginians. In the mean time Imilcar, having raised the city of Agrigentum, made an incursion into the territories of Gela and Comarina; which having ravaged in a dreadful manner, he carried off such an immense quantity of plunder, as filled his whole camp. He then marched against the city; but though it was but indifferently fortified, he met with a very vigorous resistance; and the place held out for a long time without receiving any assistance from its allies. At last Dionysius came to its assistance with an army of 50,000 foot and 1000 horse. With these he attacked the Carthaginian camp, but was repulsed with great loss; after which, he called a council of war, the result of whose deliberations was, that since the enemy was so much superior to them in strength, it would be highly imprudent to put all to the issue of a battle; and therefore, that the inhabitants should be persuaded to abandon the country, as the only means of saving their lives. In consequence of this, a trumpet was sent to Imilcar to desire a cessation of arms till the next day, in order, as was pretended, to bury the dead, but in

Carthage.

18
Abandoned
by its inha-
bitants.

reality to give the people of Gela an opportunity of making their escape. Towards the beginning of the night the bulk of the citizens left the place; and he himself with the army followed them about midnight. To amuse the enemy, he left 2000 of his light armed troops behind him, commanding them to make fires all night, and set up loud shouts as though the army still remained in town. At day-break these took the same route as their companions, and pursued their march with great celerity. The Carthaginians finding the city deserted by the greatest part of its inhabitants, immediately entered it, putting to death all who had remained; after which, Imilcar having thoroughly plundered it, moved towards Camarina. The inhabitants of this city had been likewise drawn off by Dionysius, and it underwent the same fate with Gela.

19
Peace con-
cluded.

Notwithstanding these successes, however, Imilcar finding his army greatly weakened, partly by the casualties of war, and partly by a plague which broke out in it, sent a herald to Syracuse to offer terms of peace. His unexpected arrival was very agreeable to the Syracusians, and a peace was immediately concluded upon the following terms, *viz.* That the Carthaginians, besides their ancient acquisitions in Sicily, should still possess the countries of the Silicani, the Selinuntine, the Himereans, and Agrigentines; that the people of Gela and Camarina should be permitted to reside in their respective cities, which yet should be dismantled, upon their paying an annual tribute to the Carthaginians; that all the other Sicilians should preserve their independency except the Syracusians, who should continue in subjection to Dionysius.

20
Dionysius
breaks the
treaty.

The tyrant of Syracuse, however, had concluded this peace with no other view than to gain time, and to put himself in a condition to attack the Carthaginian territories with a greater force. Having accomplished this, he acquainted the Syracusians with his design, and they immediately approved of it; upon which he gave up to the fury of the populace, the persons and possessions of the Carthaginians who resided in Syracuse and traded there on the faith of treaties. As there were many of their ships at that time in the harbour, laden with cargoes of great value, the people immediately plundered them; and, not content with this, ransacked all their houses in a most outrageous manner. This example was followed throughout the whole island; and in the mean time Dionysius dispatched a herald to Carthage with a letter to the senate and people, telling them, that if they did not immediately withdraw their garrisons from all the Greek cities in Sicily, the people of Syracuse would treat them as enemies. With this demand, however, he did not allow them to comply; for without waiting for any answer from Carthage, he advanced with his army to Mount Eryx, near which stood the city of Motya, a Carthaginian colony of great importance, and this he immediately invested. But soon after, leaving his brother Leptines to carry on the attacks, he himself went with the greatest part of his forces to reduce the cities in alliance with the Carthaginians. He destroyed their territories with fire and sword, cut down all their trees; and then he sat down before Eggesta and Entella, most

Carthage.

of the other towns having opened their gates at his approach: but these baffling his utmost efforts, he returned to Motya, and pushed on the siege of that place with the utmost vigour.

The Carthaginians, in the mean time, though alarmed at the message sent them by Dionysius, and though reduced to a miserable situation by the plague which had broke out in their city, did not despond, but sent officers to Europe, with considerable sums, to raise troops with the utmost diligence. Ten galleys were also sent from Carthage to destroy all the ships that were found in the harbour of Syracuse. The Admiral, according to his orders, entered the harbour in the night, without being discerned by the enemy; and having sunk most of the ships he found there, returned without the loss of a man.

21
Syracusan
ships de-
stroyed.

All this while the Motyans defended themselves with incredible vigour; while their enemies, desirous of revenging the cruelties exercised upon their countrymen by the Carthaginians, fought like lions. At last the place was taken by storm, and the Greek soldiers began a general massacre. For some time Dionysius was not able to restrain their fury: but at last he proclaimed that the Motyans should fly to the Greek temples; which they accordingly did, and a stop was put to the slaughter; but the soldiers took care thoroughly to plunder the town, in which they found a great treasure.

22
Motya ta-
ken by the
Greeks.

The following spring, Dionysius invaded the Carthaginian territories, and made an attempt upon Eggesta; but here he was again disappointed. The Carthaginians were greatly alarmed at his progress; but, next year, notwithstanding a considerable loss sustained in a sea-fight with Leptines, Himilco their general landed a powerful army at Panormus, seized upon Eryx, and then advancing towards Motya, made himself master of it, before Dionysius could find any forces to his relief. He next advanced to Melana, which he likewise besieged and took; after which most of the Sicili revolted from Dionysius.

23
Greeks de-
seated at se-
by the Car-
thaginians.

Notwithstanding this defection, Dionysius, finding his forces still amount to 20,000 foot and 3000 horse, advanced against the enemy. At the same time, Leptines was sent with the Syracusan fleet against that of the Carthaginians, but with positive orders not to break the line of battle upon any account whatever. But, notwithstanding these orders, he thought proper to divide his fleet, and the consequence of this was a total defeat; above 100 of the Syracusan galleys being sunk or taken, and 20,000 of their men killed in the battle or in the pursuit. Dionysius disheartened by this misfortune, returned with his army to Syracuse, being afraid that the Carthaginian fleet might become masters of that city if he should advance to fight the land army. Himilco did not fail immediately to invest the capital; and had certainly become master of it, and consequently of the whole island, had not a most malignant pestilence obliged him to desist from all further operations. This dreadful malady made great havoc among his forces: both by sea and land; and to complete his misfortunes, Dionysius attacked him unexpectedly, totally ruined his fleet, and made himself master of his camp.

24
Syracuse
besieged by
the Cartha-
ginians.

Himilco finding himself altogether unable to sustain another

25
Himilco ob-
liged to re-
turn.

Carthage. another attack, was obliged to come to a private agreement with Dionysius; who for 300 talents consented to let him escape to Africa, with the shattered remains of his fleet and army. The unfortunate general arrived at Carthage, clad in mean and sordid attire, where he was met by a great number of people bewailing their sad and inauspicious fortune. Himilco joined them in their lamentations; and being unable to survive his misfortunes, put an end to his own life. He had left Mago in Sicily, to take care of the Carthaginian interests in the best manner he could. In order to this, Mago treated all the Sicilians subject to Carthage with the greatest humanity; and having received a considerable number of soldiers from Africa, he at last formed an army with which he ventured a battle: in this he was defeated, and driven out of the field, with the loss of 800 men; which obliged him to desist from farther attempts of that nature.

26 Notwithstanding all these terrible disasters, the Carthaginians could not forbear making new attempts upon the island of Sicily; and about the year before Christ 392, Mago landed in it with an army of 80,000 men. This attempt, however, was attended with no better success than before; Dionysius found means to reduce him to such straits for want of provisions, that he was obliged to sue for peace. This continued for nine years, at the end of which the war was renewed with various success. It continued with little interruption till the year before Christ 267, when, the Syracusan state being rent by civil dissensions, the Carthaginians thought it a proper time to exert themselves, in order to become masters of the whole island. They fitted out a great fleet, and entered into alliance with Ictas, tyrant of Leontini, who pretended to have taken Syracuse under his protection. By this treaty, the two powers engaged to assist each other, in order to expel Dionysius II. after which they were to divide the island between them. The Syracusians applied for succours to the Corinthians; and they readily sent them a body of troops under the command of Timoleon an experienced general. By a stratagem, he got his forces landed at Tauroinium. The whole of them did not exceed 1200 in number: yet with these he marched against Ictas, who was at the head of 5000 men; his army he surprised at supper, put 300 of them to the sword, and took 600 prisoners. He then marched to Syracuse, and broke into one part of the town before the enemy had any notice of his approach: here he took post, and defended himself with such resolution, that he could not be dislodged by the united power of Ictas and the Carthaginians.

28 Foolish conduct of the Carthaginian admiral. In this place he remained for some time, in expectation of a reinforcement from Corinth; till the arrival of which, he did not judge it practicable to extend his conquests.—The Carthaginians being apprized that the Corinthian succours were detained by tempestuous weather at Thurium, posted a strong squadron, under Hanno their admiral, to intercept them in their passage to Sicily. But that commander, not imagining the Corinthians would attempt a passage to Sicily in such a stormy season, left his station at Thurium, and ordering his seamen to crown themselves with

garlands, and adorn their vessels with bucklers both of the Greek and Carthaginian form, failed to Syracuse in a triumphant manner. Upon his arrival there, he gave the troops in the citadel to understand, that he had taken the succours Timoleon expected, thinking by this means to intimidate them to a surrender. But, while he thus trifled away his time, the Corinthians marched with great expedition to Rhegium, and, taking the advantage of a gentle breeze, were easily wafted over into Sicily. Mago, the Carthaginian general, was no sooner informed of the arrival of this reinforcement, than he was struck with terror, though the whole Corinthian army did not exceed 4000 men; and, soon after, fearing a revolt of his mercenaries, he weighed anchor, in spite of all the remonstrances of Ictas, and set sail for Africa. Here he no sooner arrived, than, overcome with grief and shame for his unparalleled cowardice, he laid violent hands on himself. His body was hung upon a gallows or cross, in order to deter succeeding generals from forfeiting their honour in so flagrant a manner.

After the flight of Mago, Timoleon carried all before him. He obliged Ictas to renounce his alliance with the state of Carthage, and even deposed him, and continued his military preparations with the greatest vigour. On the other hand, the Carthaginians prepared for the ensuing campaign with the greatest alacrity. An army of 70,000 men was sent over, with a fleet of 200 ships of war, and 1000 transports laden with warlike engines, armed chariots, horses, and all other sorts of provisions. This immense multitude, however, was overthrown on the banks of the Crimessus by Timoleon: 10,000 were left dead on the field of battle; and of these, above 3000 were native Carthaginians of the best families in the city. Above 15,000 were taken prisoners; all their baggage and provisions, with 200 chariots, 1000 coats of mail, and 10,000 shields, fell into Timoleon's hands. The spoil, which consisted chiefly of gold and silver, was so immense, that the whole Sicilian army was three days in collecting it and stripping the slain. After this signal victory, he left his mercenary forces upon the frontiers of the enemy, to plunder and ravage the country; while he himself returned to Syracuse with the rest of his army, where he was received with the greatest demonstrations of joy. Soon after, Ictas, grown weary of his private station, concluded a new peace with the Carthaginians; and, having assembled an army, ventured an engagement with Timoleon: but in this he was utterly defeated; and himself, with Eupolemus his son, and Enthymus general of his horse, were brought bound to Timoleon, by their own soldiers. The two first were immediately executed as tyrants and traitors, and the last murdered in cold blood; Ictas's wives and daughters were likewise cruelly put to death after a public trial. In a short time after, Mamercus another of the Carthaginian confederates was overthrown by Timoleon, with the loss of 2000 men. These misfortunes induced the Carthaginians to conclude a peace on the following terms: That all the Greek cities should be set free; that the river Halycus should be the boundary between the territories of both parties; that the natives

Carthage.

29 Cowardice of Mago.

30 Exploits of Timoleon.

31 Peace concluded.

Carthage. natives of the cities subject to the Carthaginians should be allowed to withdraw, if they pleased, to Syracuse, or its dependencies, with their families and effects; and lastly, that Carthage should not, for the future, give any assistance to the remaining tyrants against Syracuse.

32
War re-
newed.

About 316 years before Christ, we find the Carthaginians engaged in another bloody war with the Sicilians, on the following occasion. Sosistratus, who had usurped the supreme authority at Syracuse, having been forced by Agathocles to raise the siege of Rhegium, returned with his shattered troops to Sicily. But soon after this unsuccessful expedition, he was obliged to abdicate the sovereignty and quit Syracuse. With him were expelled above 600 of the principal citizens, who were suspected of having formed a design to overturn the plan of government which then prevailed in the city. As Sosistratus and the exiles thought themselves ill-treated, they had recourse to the Carthaginians, who readily espoused their cause. Hereupon the Syracusians having recalled Agathocles, who had before been banished by Sosistratus, appointed him commander in chief of all their forces, principally on account of the known aversion he bore that tyrant. The war, however, did not then continue long; for Sosistratus and the exiles were quickly received again into the city, and peace was concluded with Carthage: the people of Syracuse, however, finding that Agathocles wanted to make himself absolute, exacted an oath from him, that he would do nothing to the prejudice of the democracy.

33
Agathocles
raises him-
self to the
throne of
Syracuse.

But, notwithstanding this oath, Agathocles pursued his purpose, and by a general massacre of the principal citizens of Syracuse raised himself to the throne. For some time he was obliged to keep the peace he had concluded with Carthage; but at last finding his authority established, and that his subjects were ready to second his ambitious designs, he paid no regard to his treaties, but immediately made war on the neighbouring states, which he had expressly agreed not to do, and then carried his arms into the very heart of the island. In these expeditions he was attended with such success, that in two years time he brought into subjection all the Greek part of Sicily. This being accomplished, he committed great devastations in the Carthaginian territories, their general Hamilcar not offering to give him the least disturbance. This perfidious conduct greatly incensed the people of those districts against Hamilcar, whom they accused before the senate. He died, however, in Sicily; and Hamilcar the son of Gisco was appointed to succeed him in the command of the forces.—The last place that held out against Agathocles was Messina, whither all the Syracusan exiles had retired. Papiophilus, Agathocles's general, found means to cajole the inhabitants into a treaty; which Agathocles, according to custom, paid no regard to, but, as soon as he was in possession of the town, cut off all those who had opposed his government. For, as he intended to prosecute the war with the utmost vigour against Carthage, he thought it a point of good policy to destroy as many of his Sicilian enemies as possible.

34
Defeated
by the Car-
thaginians,
and besieged
in Sy-
racuse.

The Carthaginians in the mean time having land-

ed a powerful army in Sicily, an engagement soon ensued, in which Agathocles was defeated with the loss of 7000 men. After this defeat he was obliged to shut himself up in Syracuse, which the Carthaginians immediately invested, and most of the Greek states in the island submitted to them.

Agathocles seeing himself stripped of almost all his dominions, and his capital itself in danger of falling into the hands of the enemy, formed a design which, were it not attested by writers of undoubted authority, would seem absolutely incredible. This was no less than to transfer the war into Africa, and lay siege to the enemy's capital, at a time when he himself was besieged, and only one city left to him in all Sicily. Before he departed, however, he made all the necessary preparations for the defence of the place, and appointed his brother Antandrus governor of it. He also gave permission to all who were not willing to stand the fatigues of a siege, to retire out of the city. Many of the principal citizens, Justin says 1600, accepted of this offer; but they were no sooner got out of the place, than they were cut off by parties posted on the road for that purpose. Having seized upon their estates, Agathocles raised a considerable sum, which was intended in some measure to defray the expence of the expedition; however, he carried with him only 50 talents to supply his present wants, being well assured that he should find in the enemy's country whatever was necessary for his subsistence. As the Carthaginians had a much superior fleet, they for some time kept the mouth of the harbour blocked up: but at last a fair opportunity offered; and Agathocles, hoisting sail, by the activity of his rowers soon got clear both of the port and city of Syracuse. The Carthaginians pursued him with all possible expedition; but, notwithstanding their utmost efforts, Agathocles got his troops landed with very little opposition.

Soon after his forces were landed Agathocles burnt his fleet, probably that his soldiers might behave with the greater resolution, as they saw no possibility of flying from their danger. He first advanced to a place called the *Great City*. This, after a feeble resistance, he took and plundered. From hence he marched to Tunis, which surrendered on the first summons; and Agathocles levelled both places with the ground.

The Carthaginians were at first thrown into the greatest consternation; but soon recovering themselves, the citizens took up arms with so much alacrity, that in a few days they had on foot an army of 40,000 foot and 1000 horse, with 2000 armed chariots. The command of this army they entrusted to Hanno and Bomilcar, two Generals between whom there subsisted a great animosity. This occasioned the defeat of their whole army with the loss of their camp, though all the forces of Agathocles did not exceed 14,000 in number. Among other rich spoils the conqueror found many chariots of curious workmanship, which carried 20,000 pair of fetters and manacles that the enemy had provided for the Sicilian prisoners. After this defeat, the Carthaginians, supposing themselves to have fallen under the displeasure of their deities on account of their neglecting

Carthage.

35
He invad-
ed Africa.

36
He burns
his fleet.

37
Carthagini-
ans defeat-
ed.

Carthage. glesting to sacrifice children of noble families to them, resolved to expiate this guilt. Accordingly 200 children of the first rank were sacrificed to their bloody gods, besides 300 other persons who voluntarily offered themselves to pacify the wrath of these deities.

After these expiations, Hamilcar was recalled from Sicily. When the messengers arrived, Hamilcar commanded them not once to mention the victory of Agathocles; but, on the contrary, to give out among the troops that he had been entirely defeated, his forces all cut off, and his fleet destroyed by the Carthaginians. This threw the Syracusians into the utmost despair; however, one Euryimnon, an Etolian, prevailed upon Antandrus, not to consent to a capitulation, but to stand a general assault. Hamilcar being informed of this, prepared his battering engines, and made all the necessary preparations to storm the town without delay. But while matters remained in this situation, a gally, which Agathocles had caused to be built immediately after the battle, got into the harbour of Syracuse, and acquainted the inhabitants with the certainty of Agathocles's victory. Hamilcar observing that the garrison flocked down to the port on this occasion, and expecting to find the walls unguarded, ordered his soldiers to erect scaling-ladders, and begin the intended assault. The enemy having left the ramparts quite exposed, the Carthaginians mounted them without being discerned, and had almost possessed themselves of an entire part lying between two towers, when the patrol discovered them. Upon this a warm dispute ensued; but at last the Carthaginians were repulsed with loss. Hamilcar, therefore, finding it in vain to continue the siege after such glad tidings had restored life and soul to the Syracusians, drew off his forces, and sent a detachment of 5000 men to reinforce the troops in Africa. He still entertained hopes, however, that he might oblige Agathocles to quit Africa, and return to the defence of his own dominions. He spent some time in making himself master of such cities as sided with the Syracusians; and after having brought all their allies under subjection, returned again to Syracuse, hoping to surprize it by an attack in the night-time. But being attacked while advancing through narrow passes, where his numerous army had not room to act, he was defeated with great slaughter, and himself taken prisoner, carried into Syracuse, and put to death.

40
He raises
the siege.

41
Is defeated,
and taken
prisoner
and put
to death.

42
Agrigen-
tines at-
tempt the
sovereignty
of Sicily.

43
Success of
Agathocles
in Africa.

In the mean time the Agrigentines, finding that the Carthaginians and Syracusians had greatly weakened each other by this war, thought it a proper opportunity to attempt the sovereignty of the whole island. They therefore commenced a war against both parties; and prosecuted it with such success, that in a short time they wrested many places of note both out of the hands of the Syracusians and Carthaginians.

In Africa the tyrant carried every thing before him. He reduced most of the places of any note in the territory of Carthage; and hearing that Elymas king of Libya had declared against him, he immediately entered Libya Superior, and in a great battle overthrew that prince, putting to the sword a good part of his troops, and the general who commanded them; after which he advanced against the Carthaginians

with such expedition, that he surprized and defeated them, with the loss of 2000 killed, and a great number taken prisoners. He next prepared for the siege of Carthage itself; and in order thereto advanced to a post within five miles of that city. On the other hand, notwithstanding the great losses they had already sustained, the Carthaginians, with a powerful army, encamped between him and their capital. In this situation Agathocles received advice of the defeat of the Carthaginian forces before Syracuse, and the head of Hamilcar their general. Upon this he immediately rode up to the enemy's camp, and shewing them the head, gave them an account of the total destruction of their army before Syracuse. This threw them into such consternation, that in all human probability Agathocles would have made himself master of Carthage, had not an unexpected mutiny arisen in his camp, which gave the Carthaginians an opportunity of recovering from their terror.

The year following an engagement happened, in which neither party gained any great advantage; but soon after, the tyrant, notwithstanding all his victories, found himself unable to carry on the war alone; and therefore endeavoured to gain over to his interest Ophellas, one of the captains of Alexander the Great. In this he perfectly succeeded; and, to succour his new ally the more effectually, Ophellas sent to Athens for a body of troops. Having finished his military preparations, Ophellas found his army to consist of 10,000 foot, and 600 horse, all regular troops, besides 200 chariots, and a body of 10,000 men, attended by their wives and children, as though he had been going to plant a new colony. At the head of these forces he continued his march towards Agathocles for 18 days; and then encamped at Automolæ, a city about 3000 stadia distant from the capital of his dominions. From thence he advanced thro' the Regio Syria; but found himself reduced to such extremities, that his army was in danger of perishing for want of bread, water, and other provisions. They were also greatly annoyed by serpents and wild beasts, with which that desert region abounded. The serpents made the greatest havoc among the troops; for, being of the same colour with the earth, and extremely venomous, many soldiers, who trod upon them without seeing them, were stung to death. At last, after a very fatiguing march of two months, he approached Agathocles, and encamped at a small distance from him, to the no small terror of the Carthaginians, who apprehended the most fatal consequences from this junction. Agathocles at first caressed him, and advised him to take all possible care of his troops that had undergone so many fatigues; but soon after cut him off by treachery, and then by fair words and promises persuaded his troops to serve under himself.

Agathocles now finding himself at the head of a numerous army, assumed the title of King of Africa, intending soon to complete his conquests by the reduction of Carthage. He began with the siege of Utica, which was taken by assault. After this he marched against Hippo Diarrhytus, the Biserta of the moderns, which was also taken by storm; and after this most of the people bordering upon the sea-coasts, and

44
He makes
an alliance
with Ophel-
las;

45
Whom he
treacher-
ously mur-
ders.

Carthage.

46
Is obliged
to return
home.

47
Success of
Archagathus.

48
He is reduc-
ed to the
ut-
most.

and even those who inhabited the inland parts of the country, submitted to him. But in the midst of this career of success, the Sicilians formed an association in favour of liberty ; which obliged the tyrant to return home, leaving his son Archagathus to carry on the war in Africa.

Archagathus, after his father's departure, greatly extended the African conquests. He sent Eumachus at the head of a large detachment to invade some of the neighbouring provinces, while he himself, with the greatest part of his army, observed the motions of the Carthaginians. Eumachus falling into Numidia, first took the great city of Tocas, and conquered several of the Numidian cantons. Afterwards he besieged and took Phellina ; which was attended with the submission of the Aphodelodians, a nation, according to Diodorus, as black as the Ethiopians. He then reduced several cities ; and being at last elated with such a run of good fortune, resolved to penetrate into the more remote parts of Africa. Here he at first met with success ; but hearing that the barbarous nations were advancing in a formidable body to give him battle, he abandoned his conquests, and retreated with the utmost precipitation towards the sea-coasts, after having lost abundance of men.

This unfortunate expedition made a great alteration for the worse in the affairs of Archagathus. The Carthaginians being informed of Eumachus's bad success, resolved to exert themselves in an extraordinary manner to repair their former losses. They divided their forces into three bodies : one of these they sent to the sea-coasts, to keep the towns there in awe ; another they dispatched into the Mediterranean parts, to preserve the allegiance of the inhabitants there ; and the last body they ordered to the Upper Africa, to support their confederates in that country. Archagathus being apprised of the motions of the Carthaginians, divided his forces likewise into three bodies. One of these he sent to observe the Carthaginian troops on the sea-coasts, with orders to advance afterwards into the Upper Africa ; another, under the command of *Æschion*, one of his generals, he posted at a proper distance in the heart of the country, to have an eye both on the enemy there and the barbarous nations ; and with the last, which he led in person, he kept nearer Carthage, preserving a communication with the other two, in order to fend them succours, or regal them, as the exigency of affairs should require.—The Carthaginian troops sent into the heart of the country, were commanded by Hanno, a general of great experience, who being informed of the approach of *Æschion*, laid an ambuscade for him, into which he was drawn and cut off with 4000 foot and 200 horse. Himilco, who commanded the Carthaginian forces in Upper Africa, having advice of Eumachus's march, immediately advanced against him. An engagement ensued, in which the Greeks were almost totally cut off, or perished with thirst after the battle, out of 8000 foot only 30, and of 800 horse only 40, having the good fortune to make their escape.

Archagathus receiving the melancholy news of these two defeats, immediately called in the detachments he had sent out to harass the enemy, which would otherwise have been instantly cut off. He was, how-

ever, in a short time hemmed in on all sides in such a manner as to be reduced to the last extremity for want of provisions, and ready every moment to be swallowed up by the numerous forces which surrounded him. In this deplorable situation Agathocles received an express from Archagathus, acquainting him of the losses he had sustained and the scarcity of provisions he laboured under. Upon this the tyrant, leaving the care of the Sicilian war to one Leptines, by a stratagem got 18 Etruscan ships that came to his assistance out of the harbour ; and then engaging the Carthaginian squadron which lay in its neighbourhood, took five of their ships, and made all their men prisoners. By this means he became master of the port, and secured a passage into it for the merchants of all nations, which soon restored plenty to that city, where the famine before had begun to make great havoc. Supplying himself, therefore, with a sufficient quantity of necessaries for the voyage he was going to undertake, he immediately set sail for Africa.

Upon his arrival in this country, Agathocles reviewed his forces, and found them to consist of 6000 Greeks, as many Samnites, Celtes, and Etruscans ; besides 10,000 Africans, and 1500 horse. As he found his troops almost in a state of despair, he thought this a proper time for offering the enemy battle. The Carthaginians, however, did not think proper to accept the challenge ; especially as by keeping close in their camp, where they had plenty of every thing, they could starve the Greeks to a surrender without striking a stroke. Upon this Agathocles attacked the Carthaginian camp with great bravery, made a considerable impression upon it, and might perhaps have carried it, had not his mercenaries deserted him almost at the first onset. By this piece of cowardice he was forced to retire with precipitation to his camp, whither the Carthaginians pursued him very closely, doing great execution in the pursuit.

The next night, the Carthaginians sacrificed all the prisoners of distinction as a grateful acknowledgment to the gods for the victory they had gained. While they were employed in this inhuman work, the wind, suddenly rising, carried the flames to the sacred tabernacle near the altar, which was entirely consumed, as well as the general's tent, and those of the principal officers adjoining to it. A dreadful alarm took place through the whole camp, which was heightened by the great progress the fire made. For the soldiers tents consisting of very combustible materials, and the wind blowing in a most violent manner, the whole camp was almost entirely laid in ashes ; and many of the soldiers endeavouring to carry off their arms, and the rich baggage of their officers, perished in the flames. Some of those who made their escape, met with a fate equally unhappy. For, after Agathocles had received the last blow, the Africans deserted him, and were at that instant coming over in a body to the Carthaginians. These, the persons who were flying from the flames took to be the whole Syracusan army advancing in order of battle to attack their camp. Upon this, a dreadful confusion ensued. Some took to their heels ; others fell down in heaps one upon another ; and others engaged their comrades, mistaking them for the enemy. Five thousand men lost

Carthage.

49
Agathocles
arrives in
Africa.

50
Attacks a
camp of the
enemy
without
success.

51
Diffuses
in the C
thaginian
camp.

Carthage.

52
Another in
that of A-
gathocles.

their lives in this tumult, and the rest thought proper to take refuge within the walls of Carthage; nor could the appearance of day-light, for some time, dissipate their terrible apprehensions. In the mean time, the African deserters, observing the great confusion the Carthaginians were in, and not knowing the meaning of it, were so terrified, that they thought proper to return to the place from whence they came. The Syracusians seeing a body of troops advancing towards them in good order, concluded that the enemy were marching to attack them, and therefore immediately cried out "To arms." The flames ascending out of the Carthaginian camp into the air, and the lamentable outcries proceeding from thence, confirmed them in this opinion, and greatly heightened their confusion. The consequence was much the same as in the Carthaginian camp; for coming to blows with one another instead of the enemy, they scarce recovered their senses upon the return of light, and the infinite fray was so bloody, that it cost Agathocles 4000 men.

53
He escapes
privately.

This last disaster so disheartened the tyrant, that he immediately set about contriving means for making his escape privately; and this he at last, though with great difficulty, effected. After his departure, his two sons were immediately put to death by the soldiers, who, choosing a leader from among themselves, made peace with the Carthaginians upon the following conditions: 1. That the Greeks should deliver up all the places they held in Africa, receiving from them 300 talents. 2. That such of them as were willing to serve in the Carthaginian army should be kindly treated, and receive the usual pay; and, 3. That the rest should be transported to Sicily, and have the city of Selinus for their habitation.

54
Causes of
the first
Punic War.

From this time, to that of their first war with the Romans, we find nothing remarkable in the history of the Carthaginians. The first Punic war, as it is commonly called, happened about 256 years before Christ. At that time, the Carthaginians were possessed of extensive dominions in Africa; they had made considerable progress in Spain; were masters of Sardinia, Corsica, and all the islands on the coast of Italy; and had extended their conquests to a great part of Sicily. The occasion of the first rupture between the two republics, was as follows. The Mamertines being vanquished in battle, and reduced to great straits by Hiero king of Syracuse, had resolved to deliver up Messina, the only city they now possessed, to that prince, with whose mild government and strict probity they were well acquainted. Accordingly, Hiero was advancing at the head of his troops to take possession of the city, when Hannibal, who at that time commanded the Carthaginian army in Sicily, prevented him by a stratagem. He came to meet Hiero, as it were to congratulate him on his victory; and amused him, while some of the Carthaginian troops filed off towards Messina. Hereupon the Mamertines, seeing their city supported by a new reinforcement, were divided into several opinions. Some were for accepting the protection of Carthage; others were for surrendering to the king of Syracuse; but the greater part were for calling in the Romans to their assistance. Deputies were accordingly dispatched

to Rome, offering the possession of the city to the Romans, and in the most moving terms imploring protection. This, after some debate, was agreed to; and the consul Appius Claudius received orders to attempt a passage to Sicily, at the head of a powerful army. Being obliged to stay some time at Rome, however, one Caius Claudius, a person of great integrity and resolution, was dispatched with a few vessels to Rhegium. On his arrival there, he observed the Carthaginian squadron to be so much superior to his own, that he thought it would be little better than madness to attempt at that time to transport forces to Sicily. He crossed the straits, however, and had a conference with the Mamertines, in which he prevailed upon them all to accept of the protection of Rome; and on this he made the necessary preparations for transporting his forces. The Carthaginians being informed of the resolutions of the Romans, sent a strong squadron of galleys under the command of Hanno, to intercept the Roman fleet; and accordingly the Carthaginian admiral, coming up with them near the coast of Sicily, attacked them with great fury. During the engagement, a violent storm arose, which dashed many of the Roman vessels against the rocks, and did a vast deal of damage to their squadron, by which means Claudius was forced to retire to Rhegium, and this he accomplished with great difficulty. Hanno restored all the vessels he had taken; but ordered the deputies sent with them, to expostulate with the Roman general upon the infraction of the treaties subsisting between the two republics. This expostulation, however just, produced an open rupture; Claudius soon after possessing himself of Messina.

Carthage.

55
Hanno in-
tercepts the
Roman
fleet.

Such was the beginning of the first Punic war, which is said to have lasted 24 years. The first year, the Carthaginians and Syracusians laid siege to Messina; but, not acting in concert as they ought to have done, were overthrown by the Consul Appius Claudius; and this defeat so much disgusted Hiero with the Carthaginians, that he soon after concluded an alliance with the Romans. After this treaty, having no enemy to contend with but the Carthaginians, the Romans made themselves masters of all the cities on the western coast of Sicily, and at the end of the campaign carried back most of their troops with them to take up their winter-quarters in Italy.

56
Carthagi-
nians and Sy-
racusians
defeated by
the Ro-
mans.

The second year, Hanno the Carthaginian general fixed his principal magazine at Agrigentum. This place was very strong by nature, had been rendered almost impregnable by the new fortifications raised by the Carthaginians during the preceding winter, and was defended by a numerous garrison commanded by one Hannibal a general of great experience in war. For five months the Romans attempted to reduce the place by famine, and had actually brought the inhabitants to great distress, when a Carthaginian army of 50,000 foot, 6000 horse, and 60 elephants, landed at Lilybeum, and from thence marched to Heraclea, within 20 miles of Agrigentum. There the general received a deputation from some of the inhabitants of Erbesa, where the Romans had their magazines, offering to put the town into his hands. It was accordingly delivered; up and by this means the Romans became so much distressed, that they had certainly been obliged

57
Agrigen-
tum taken
by the Ro-
mans.

Carthage. to abandon their enterprize, had not Hiero supplied them with provisions. But all the assistance he was able to give could not long have supported them, as their army was so much weakened by disorders occasioned by famine, that, out of 100,000 men of whom it originally consisted, scarce a fourth part remained fit for service, and could no longer subsist on such parsimonious supplies. But in the mean time Hannibal acquainted Hanno that the city was reduced to the utmost distress; upon which he resolved to venture an engagement, which he had before declined. In this the Romans were victorious, and the city surrendered at discretion, though Hannibal with the greatest part of the garrison made their escape. This ended the campaign; and the Carthaginians being greatly chagrined at their bad success, fined Hanno of an immense sum of money, and deprived him of his command, appointing Hamilcar to succeed him in the command of the land army, and Hannibal in that of the fleet.

58 They build a fleet, The third year, Hannibal received orders to ravage the coasts of Italy; but the Romans had taken care to post detachments in such places as were most proper to prevent his landing, so that the Carthaginian found it impossible to execute his orders. At the same time, the Romans, perceiving the advantages of being masters of the sea, set about building 120 gallees. While this was doing, they made themselves masters of most of the inland cities, but the Carthaginians reduced or kept steady in their interest most of the maritime ones; so that both parties were equally successful during this campaign.

59 And defeat the Carthaginians at sea. The fourth year, Hannibal by a stratagem made himself master of 17 Roman gallees; after which he committed great ravages on the coast of Italy, whither he had advanced to take a view of the Roman fleet. But he was afterwards attacked in his turn, lost the greatest part of his ships, and with great difficulty made his own escape. Soon after he was totally defeated by the consul Duillius, with the loss of 80 ships taken, thirteen sunk, 7000 men killed, and as many taken prisoners. After this victory Duillius landed in Sicily, put himself at the head of the land forces, relieved Segesta besieged by Hamilcar, and made himself master of Macella, though defended by a numerous garrison.

60 Sicilians defeated by the Carthaginians. The fifth year, a difference arose between the Romans and their Sicilian allies, which came to such a height, that they encamped separately. Of this Hamilcar availed himself, and, attacking the Sicilians in their entrenchments, put 4000 of them to the sword. He then drove the Romans from their posts, took several cities from them, and over-ran the greatest part of the country. In the mean time, Hannibal, after his defeat, sailed with the shattered remains of his fleet to Carthage: but in order to secure himself from punishment, he sent one of his friends with all speed, before the event of the battle was known there, to acquaint the senate, that the Romans had put to sea with a good number of heavy ill-built vessels, each of them carrying some machine, the use of which the Carthaginians did not understand; and asked whether it was the opinion of the senate that Hannibal should attack them. These machines were the *corvi*, which were

then newly invented, and by means of which, chiefly, Duillius had gained the victory. The senate were unanimous in their opinion, that the Romans should be attacked; upon which the messenger acquainted them with the unfortunate event of the battle. As the senators had already declared themselves for the engagement, they spared their general's life, and, according to Polybius, even continued him in the command of the fleet. In a short time, being reinforced by a good number of gallees, and attended by some officers of great merit, he sailed for the coast of Sardinia. He had not been long here, before he was surprised by the Romans, who carried off many of his ships, and took great numbers of his men prisoners. This so incensed the rest, that they seized their unfortunate admiral, and crucified him; but who was his immediate successor, does not appear.

61 Corfica and Sardinia reduced by the Romans. The sixth year, the Romans made themselves masters of the islands of Corfica and Sardinia. Hanno, who commanded the Carthaginian forces in the latter, defended himself at a city called Olbia with incredible bravery; but being at last killed in one of the attacks, the place was surrendered, and the Romans soon became masters of the whole island.

62 The Roman army in great danger, 63 Refused to die brave of a legionary tribune. The seventh year, the Romans took the town of Mytestratum, in Sicily, from whence they marched towards Camarina, but in their way were surrounded in a deep valley, and in the most imminent danger of being cut off by the Carthaginian army. In this extremity, a legionary tribune, by name *M. Calpurnius Flamma*, desired the general to give him 200 chosen men; promising, with this small company, to find the enemy such employment as should oblige them to leave a passage open for the Roman army. He performed his promise with a bravery truly heroic; for, having seized, in spite of all opposition, an eminence, and entrenched himself on it, the Carthaginians, jealous of his design, flocked from all quarters to drive him from his post. But the brave tribune kept their whole army in play, till the consul, taking advantage of the diversion, drew his army out of the bad situation in which he had imprudently brought it. The legions were no sooner out of danger, than they hastened to the relief of their brave companions: but all they could do was to save their bodies from the insults of their enemies; for they found them all dead on the spot, except Calpurnius who lay under an heap of dead bodies all covered with wounds, but still breathing. His wounds were immediately dressed, and it fortunately happened that none of them proved mortal; and for this glorious enterprize he received a crown of *grape*.—After this the Romans reduced several cities, and drove the enemy quite out of the territory of the Agrigentines; but were repulsed with great loss before Lipara.

64 Carthaginians defeated at sea by the Romans. The eighth year, Regulus, who commanded the Roman fleet, observing that of the Carthaginians lying along the coast in disorder, sailed with a squadron of ten gallees to observe their number and strength, ordering the rest of the fleet to follow him with all expedition. But, as he drew too near the enemy, he was surrounded by a great number of Carthaginian gallees. The Romans fought with their usual bravery; but, being overpowered with numbers, were obliged to

Carthage. to yield. The consul, however, found means to make his escape, and join the rest of the fleet; and then had his full revenge of the enemy, 18 of their ships being taken, and eight sunk.

65
Regulus in-
vades Africa.
The ninth year, the Romans made preparations for invading Africa. Their fleet for this purpose consisted of 330 galleys, each of them having on board 120 foldiers and 300 rowers. The Carthaginian fleet consisted of 360 sail, and was much better manned than that of the Romans. The two fleets met near Ecnomus, a promontory in Sicily; where, after a bloody engagement which lasted the greater part of the day, the Carthaginians were entirely defeated, with the loss of 30 galleys sunk, and 63 taken with all their men. The Romans lost only 24 galleys, which were all sunk.—After this victory, the Romans having refitted their fleet, set sail for the coast of Africa, with all expedition. The first land they got sight of was Cape Hermæ, where the fleet lay at anchor for some time waiting till the galleys and transports came up. From thence they coasted along till they arrived before Clupea, a city to the east of Carthage, where they made their first descent.

66
Carthaginians in great consternation.
No words can express the consternation of the Carthaginians, on the arrival of the Romans in Africa. The inhabitants of Clupea were so terrified, that, according to Zonaras, they abandoned the place, which the Romans immediately took possession of. Having left there a strong garrison to secure their shipping, and keep the adjacent territory in awe, they moved nearer Carthage, taking a great number of towns; they likewise plundered a prodigious number of villages, laid vast numbers of noblemen's seats in ashes, and took above 20,000 prisoners. In short, having plundered and ravaged the whole country, almost to the gates of Carthage, they returned to Clupea laden with the immense booty they had acquired in the expedition.

67
Success of
Regulus.
The tenth year, Regulus pushed on his conquests with great rapidity. To oppose his progress, Hamilcar was recalled from Sicily, and with him Boslar and Afrubal were joined in command. Hamilcar commanded an army just equal to that of Regulus. The other two commanded separate bodies, which were to join him or act apart as occasion required. But, before they were in a condition to take the field, Regulus, pursuing his conquests, arrived on the banks of the *Bragada*, a river which empties itself into the sea at a small distance from Carthage. Here he had a monstrous serpent to contend with, which, according to the accounts of those days, infected the waters of the river, poisoned the air, and killed all other animals with its breath alone. When the Romans went to draw water, this huge dragon attacked them; and, twisting itself round their bodies, either squeezed them to death, or swallowed them alive. As its hard and thick scales were proof against their darts and arrows, they were forced to have recourse to the *Balistræ*, which they made use of in sieges to throw great stones, and to beat down the walls of besieged cities. With these they discharged showers of huge stones against this new enemy, and had the good luck, with one of them, to break his back-bone; which disabled him from twisting and winding his

immense body, and by that means gave the Romans an opportunity of approaching and dispatching him with their darts. But his dead body corrupted the air, and the water of the river; and spread so great an infection over the whole country, that the Romans were obliged to decamp. We are told that Regulus sent to Rome the skin of this monster, which was 120 feet long; and that it was hung up in a temple, where it was preserved to the time of the Nuntantine war.

Having passed this river, he besieged *Adir*, or *Adda*, not far from Carthage, which the enemy attempted to relieve; but as they lay encamped among hills and rocks, where their elephants, in which the main strength of their army consisted, could be of no use, Regulus attacked them in their camp, killed 17,000 of them, and took 5000 prisoners, and 18 elephants. Upon the fame of this victory, deputations came from all quarters, inasmuch that the conqueror in a few days became master of 80 towns; among which were the city and port of Utica. This increased the alarm at Carthage; which was reduced to despair, when Regulus laid siege to Tunis, a great city about nine miles from the capital. The place was taken in sight of the Carthaginians, who, from their walls, beheld all the operations of the siege, without making the least attempt to relieve it. And to complete their misfortunes, the Numidians, their neighbours, and implacable enemies, entered their territories, committing every where the most dreadful devastations, which soon occasioned a great scarcity of provisions in the city. The public magazines were soon exhausted; and, as the city was full of selfish merchants, who took advantage of the public distress, to sell provisions at an exorbitant price, a famine ensued, with all the evils which attend it.

In this extremity Regulus advanced to the very gates of Carthage; and having encamped under the walls, sent deputies to treat of a peace with the senate. The deputies were received with inexpressible joy; but the conditions they proposed were such that the senate could not hear them without the greatest indignation. They were, 1. That the Carthaginians should relinquish all claims to Sardinia, Corsica, and Sicily. 2. That they should restore to the Romans all the prisoners they had taken from them since the beginning of the war. 3. That if they cared to redeem any of their own prisoners, they should pay so much a head for them as Rome should judge reasonable. 4. That they should for ever pay the Romans an annual tribute. 5. That for the future they should fit out but one man of war for their own use, and 50 triremes to serve in the Roman fleet, at the expense of Carthage, when required by any of the future consuls. These extravagant demands provoked the senators, who loudly and unanimously rejected them; the Roman deputies, however, told them that Regulus would not alter a single letter of the proposals, and that they must either conquer the Romans or obey them.

In this extreme distress, some mercenaries arrived from Greece, among whom was a Lacedæmonian by name Xanthippus, a man of great valour and experience in war. This man, having informed himself of

Carthage.

69
Defences of
Carthaginians,

70
And re-
solves die to
the utmost
despair.

71
His propo-
sals of
peace re-
jected.

72
Xanthippus
appointed
to com-
mand the
Carthaginian
army.

Carthage. the circumstances of the late battle, declared publicly, that their overthrow was more owing to their own misconduct than to the superiority of the enemy. This discourse being spread abroad, came at last to the knowledge of the senate; and by them, and even by the desire of the Carthaginian generals themselves, Xanthippus was appointed commander in chief of their forces. His first care was to discipline his troops in a proper manner. He taught them how to march, encamp, widen and close their ranks, and rally after the Lacedæmonian manner under their proper colours. He then took the field with 12,000 foot, 4000 horse, and 100 elephants. The Romans were surpris'd at the sudden alteration they observed in the enemy's conduct; but Regulus, elated with his last success, came and encamped at a small distance from the Carthaginian army in a vast plain, where their elephants and horse had room to act. The two armies were parted by a river, which Regulus boldly pass'd, by which means he left no room for a retreat in case of any misfortune. The engagement began with great fury; but ended in the total defeat of the Romans, who, except 2000 that escap'd to Clupea, were all killed, or taken prisoners; and among the latter was Regulus himself. The loss of the Carthaginians scarce exceeded 800 men.

73
The Romans utterly defeated, and Regulus taken.

74
He is cruelly wiled.

75
Carthaginians defeated by sea and land.

The Carthaginians remained on the field of battle till they had shipped the slain; and then entered their metropolis, which was almost the only place left them, in great triumph. They treated all their prisoners with great humanity, except Regulus; but as for him, he had so insulted them in his prosperity, that they could not forbear shewing the highest marks of their resentment. According to Zonaras and others, he was thrown into a dungeon, where he had only sustenance allowed him barely sufficient to keep him alive. Nay, his cruel masters, to lighten his other torments, ordered an huge elephant, at the sight of which animal, it seems, he was greatly terrified, to be constantly placed near him; which prevented him from enjoying any tranquillity or repose.

The eleventh year of this war, the Carthaginians, elated with their victory over Regulus, began to talk in a very high strain, threatening Italy itself with an invasion. To prevent this, the Romans took care to garrison all their maritime towns, and fitted out a new fleet. In the mean time, the Carthaginians besieged Clupea and Utica in vain, being obliged to abandon their enterprise, upon hearing that the Romans were equipping a fleet of 350 sail. The Carthaginians having with incredible expedition refitted their old vessels, and built a good number of new ones, met the Roman fleet off Cape Hermea. An engagement ensued, in which the Carthaginians were utterly defeated; 104 of their ships being sunk, 30 taken, and 15,000 of their soldiers and rowers killed in the action. The Romans pursued their course to Clupea, where they were no sooner landed, than they found themselves attacked by the Carthaginian army, under the two Hanno's, father and son. But, as the brave Xanthippus no longer commanded their army, notwithstanding the Lacedæmonian discipline he had introduced among them, they were routed at the very first

onset, with the loss of 9000 men, and among them many of their chief lords.

Notwithstanding all their victories, however, the Romans found themselves now obliged, for want of provisions, to evacuate both Clupea and Utica, and abandon Africa altogether. Being desirous of signifying the end of their consulate by some important conquest on Sicily, the consuls steered for that island, contrary to the advice of their pilots, who represented their danger, on account of the season being so far advanced. Their obstinacy proved the destruction of the whole fleet; for a violent storm arising, out of 370 vessels, only 80 escap'd shipwreck, the rest being swallowed up by the sea, or dashed against the rocks. This was by far the greatest loss that Rome had ever sustained; for besides the ships that were cast away with their crews, a numerous army was destroyed, with all the riches of Africa, which had been by Regulus amassed and deposited in Clupea, and were now from thence transporting to Rome. The whole coast from Pachinum to Camerina was covered with dead bodies, and wrecks of ships; so that history can scarce afford an example of such a dreadful disaster.

The twelfth year, the Carthaginians hearing of this misfortune of the Romans, renewed the war in Sicily with fresh fury, hoping the whole island, which was now left defenceless, would fall into their hands. Carthalo, a Carthaginian commander, besieged and took Agrigentum. The town he laid in ashes and demolished the walls, obliging the inhabitants to fly to Olympium. Upon the news of this success, Adrubal was sent to Sicily with a large reinforcement of troops, and 150 elephants. They likewise fitted out a squadron, with which they retook the island of Cofyra, and marched a strong body of forces into Mauritania and Numidia, to punish the people of those countries for shewing a disposition to join the Romans. In Sicily the Romans possessed themselves of Cephalodium and Panormus, but were obliged by Carthalo to raise the siege of Drepanum with great loss.

The 13th year, the Romans sent out a fleet of 260 gallies, which appeared off Lilybæum in Sicily; but finding this place too strong, they steered from thence to the eastern coast of Africa, where they made several descents, surpris'd some cities, and plundered several towns and villages. They arrived safe at Panormus, and in a few days set sail for Italy, having a fair wind till they came off Cape Palinurus, where so violent a storm overtook them, that 160 of their gallies and a great number of their transports were lost; upon which the Roman senate made a decree, that, for the future, no more than 50 vessels should be equipped; and that these should be employed only in guarding the coast of Italy, and transporting the troops into Sicily.

The 14th year, the Romans made themselves masters of Himera and Lipara in Sicily; and the Carthaginians conceiving new hopes of conquering that island, began to make fresh levies in Gaul and Spain, and to equip a new fleet. But their treasures being exhausted, they applied to Ptolemy king of Egypt, intreating him to lend them 2000 talents: but he being resolved to stand neuter, refused to comply with

Carthage.

76
Romans obliged to abandon Africa.

77
Their fleet totally destroyed by a storm.

78
Agrigentum taken and destroyed by the Carthaginians.

79
The Romans fit out a new fleet.

80
Which is again destroyed.

their

Carthage. their request; telling them, that he could not without breach of fidelity assist one friend against another. However, the republic of Carthage making an effort, equipped a fleet of 200 sail, and raised an army of 30,000 men, horse and foot, and 140 elephants, appointing Adrubal commander in chief both of the fleet and army. The Romans then finding the great advantages of a fleet, resolved to equip one notwithstanding all former disasters; and while the vessels were building, two consuls were chosen, men of valour and experience, to supersede the acting ones in Sicily. Metellus, however, one of the former consuls, being continued with the title of proconsul, found means to draw Adrubal into a battle on disadvantageous terms near Panormus, and then falling upon him, gave him a most terrible overthrow. Twenty thousand of the enemy were killed, and many elephants. An hundred and four elephants were taken with their leaders, and sent to Rome, where they were hunted and put to death in the circus.

83 Lilibæum besieged by the Romans. * See Lilibæum.

The 15th year, the Romans besieged Lilibæum; and the siege continued during the rest of the first Punic war, and was the only thing remarkable that happened during that time*. The Carthaginians, on the first news of its being besieged, sent Regulus with some deputies to Rome to treat of a peace: but instead of forwarding the negotiation, he hindered it; and notwithstanding he knew the torments prepared for him at Carthage, could not be prevailed upon to stay at Rome, but returning to his enemies country, was put to a most cruel death. During this siege, the Roman fleet under Claudius Pulcher was utterly defeated by Adherbal the Carthaginian admiral. Ninety of the Roman galleys were lost in the action, 8000 of their men either killed or drowned, and 20,000 taken and sent, prisoners to Carthage; and the Carthaginians gained this signal victory without the loss of a single ship, or even a single man. Another Roman fleet met with a still s severer fate. It consisted of 120 galleies, 800 transports, and was laden with all sorts of military stores and provisions. Every one of these vessels was lost by a storm, with all they contained, not a single plank being saved that could be used again; so that the Romans found themselves once more deprived of their whole naval force.

86 Hamilcar Barcas sent into Sicily.

In the mean time, the Carthaginian soldiery having shewn a disposition to mutiny, the senate sent over Hamilcar Barcas, father of the famous Hannibal, to Sicily. He received a charte blanche from the senate to act as he thought proper; and by his excellent conduct and resolution, showed himself the greatest general of his age. He defended Eryx, which he had taken by surprise, with such vigour, that the Romans would never have been able to make themselves masters of it, had they not fitted out a new fleet at the expence of private citizens, which, having utterly defeated that of the Carthaginians, Hamilcar, notwithstanding all his valour, was obliged to yield up the place which he had so long and so bravely defended. The following articles of a peace were immediately drawn up between the two commanders.

1. The Carthaginians shall evacuate all the places

which they have in Sicily, and entirely quit that island. 2. They shall, in 20 years, pay the Romans, at equal payments every year, 2200 talents of silver, that is, £. 437,250 Sterling. 3. They shall restore the Roman captives and deserters without ransom, and redeem their own prisoners with money. 4. They shall not make war upon Hiero king of Syracuse, or his allies. These articles being agreed to, Hamilcar surrendered Eryx upon condition that all his soldiers should march out with him upon his paying for each of them 18 *Roman denarii*. Hostages were given on both sides, and deputies were sent to Rome to procure a ratification of the treaty by the senate. After the senators had thoroughly informed themselves of the state of affairs, two more articles were added, viz. 1. That 1000 talents should be paid immediately, and the 2200 in the space of 10 years at equal payments. 2. That the Carthaginians should quit all the little islands about Italy and Sicily, and never more come near them with ships of war, or raise mercenaries in those places. Necessity obliged Hamilcar to consent to these terms; but he returned to Carthage with an hatred to the Romans, which he did not even suffer to die with him, but transmitted to his son the great Hannibal.

88 Causes of the war with the mercenaries.

The Carthaginians were no sooner got out of this bloody and expensive war, than they found themselves engaged in another which was like to have proved fatal to them. It is called by ancient historians the *Libyan war*, or the war with the mercenaries. The principal occasion of it was, that when Hamilcar returned to Carthage, he found the republic so much impoverished, that, far from being able to give these troops the largesses and rewards promised them, it could not pay them their arrears. He had committed the care of transporting them to one *Gisco*, who, being an officer of great penetration, as though he had foreseen what would happen, did not ship them off all at once, but in small and separate parties, that those who came first might be paid off and sent home before the arrival of the rest. The Carthaginians at home, however, did not act with the same prudence. As the state was almost entirely exhausted by the last war, and the immense sum of money, in consequence of the peace, paid to the Romans, they judged it would be a laudable action to save something to the public. They did not therefore pay off the mercenaries in proportion as they arrived, thinking it more proper to wait till they all came together, with a view of obtaining some remission of their arrears. But being soon made sensible of their wrong conduct on this occasion, by the frequent disorders these barbarians committed in the city, they with some difficulty prevailed upon the officers to take up their quarters at Sica, and canton their troops in that neighbourhood. To induce them to this, however, they gave them a sum of money for their present subsistence, and promised to comply with their pretensions when the remainder of their troops arrived from Sicily. Here, being wholly immersed in idleness, to which they had long been strangers, a neglect of discipline ensued, and of course a petulant and licentious spirit immediately took place. They were now determined not to ac-

quiesce

Carthage.

89
Imprudent
conduct of
Hanno.

quiesce in receiving their bare pay, but to insist upon the rewards Hamilcar had promised them, and even to compel the state of Carthage to comply with their demands by force of arms. The senate being informed of the mutinous disposition of the soldiery, dispatched Hanno, one of the suffetes, to pacify them. Upon his arrival at Sica, he expatiated largely upon the poverty of the state, and the heavy taxes with which the citizens of Carthage were loaded; and therefore, instead of answering their high expectations, he desired them to be satisfied with receiving part of their pay, and remit the remainder to serve the pressing exigencies of the republic. The mercenaries being highly provoked, that neither Hamilcar, nor any other of the principal officers who commanded them in Sicily, and were the best judges of their merit, made their appearance on this occasion, but only Hanno, a person utterly unknown, and above all others utterly disagreeable to them, immediately had recourse to arms. Assembling therefore in a body to the number of 20,000, they advanced to Tunis, and immediately encamped before that city.

The Carthaginians being greatly alarmed at the approach of so formidable a body to Tunis, made large concessions to the mercenaries, in order to bring them back to their duty: but, far from being softened, they grew more insolent upon these concessions, taking them for the effects of fear; and therefore were altogether averse to thoughts of accommodation. The Carthaginians, making a virtue of necessity, shewed a disposition to satisfy them in all points, and agreed to refer themselves to the opinion of some general in Sicily, which they had all along desired; leaving the choice of such commander entirely to them. Gisco was accordingly pitched upon to mediate this affair, the mercenaries believing Hamilcar to have been a principal cause of the ill treatment they met with, since he never appeared among them, and, according to the general opinion, had voluntarily resigned his commission. Gisco soon arrived at Tunis with money to pay the troops; and, after conferring with the officers of the several nations apart, he harangued them in such a manner that a treaty was upon the point of being concluded, when Spendius and Mathos, two of the principal mutineers, occasioned a tumult in every part of the camp. Spendius was by nation a Campanian, who had been a slave at Rome, and had fled to the Carthaginians. The apprehensions he was under of being delivered to his old master, by whom he was sure to be hanged or crucified, prompted him to break off the accommodation. Mathos was an African, and free born; but as he had been active in raising the rebellion, and was well acquainted with the implacable disposition of the Carthaginians, he knew that a peace must infallibly prove his ruin. He therefore joined with Spendius, and insinuated to the Africans the danger of concluding a treaty at that juncture, which could not but leave them singly exposed to the rage of the Carthaginians. This so incensed the Africans, who were much more numerous than the troops of any other nation, that they immediately assembled in a tumultuous manner. The

foreigners soon joined them, being inspired by Spendius with an equal degree of fury. Nothing was now to be heard but the most horrid oaths and imprecations against Gisco and the Carthaginians. Whoever offered to make any remonstrance, or lend an ear to temperate counsels, was stoned to death by the enraged multitude. Nay, many persons lost their lives barely for attempting to speak, before it could be known whether they were in the interest of Spendius or the Carthaginians.

In the midst of these commotions, Gisco behaved with great firmness and intrepidity. He left no methods untried to soften the officers and calm the minds of the soldiery; but the torrent of sedition was now so strong, that there was no possibility of keeping it within bounds. They therefore seized upon the military chest, dividing the money among themselves in part of their arrears, put the person of Gisco under an arrest, and treated him as well as his attendants with the utmost indignity. Mathos and Spendius, to destroy the remotest hopes of an accommodation with Carthage, applauded the courage and resolution of their men, loaded the unhappy Gisco and his followers with irons, and formally declared war against the Carthaginians. All the cities of Africa, to whom they had sent deputies to exhort them to recover their liberty, soon came over to them, except Utica and Hippo Diarrhytus. By this means their army being greatly increased, they divided it into two parts, with one of which they moved towards Utica, whilst the other marched to Hippo, in order to besiege both places. The Carthaginians, in the mean time, found themselves ready to sink under the pressure of their misfortunes. After they had been harassed 24 years by a most cruel and destructive foreign war, they entertained some hopes of enjoying repose. The citizens of Carthage drew their particular subsistence from the rents or revenues of their lands, and the public expences from the tribute paid from Africa; all which they were not only deprived of at once, but, what was worse, had it directly turned against them. They were destitute of arms and forces either by sea or land; had made no preparations for the sustaining of a siege, or the equipping of a fleet. They suffered all the calamities incident to the most ruinous civil war; and, to complete their misery, had not the least prospect of receiving assistance from any foreign friend or ally. Notwithstanding their deplorable situation, however, they did not despond, but pursued all the measures necessary to put themselves into a posture of defence. Hanno was appointed commander in chief of all their forces; and the most strenuous efforts were made, not only to repel all the attempts of the mutineers, but even to reduce them by force of arms.

In the mean time Mathos and Spendius laid siege to Utica and Hippacra at once; but as they were carried on by detachments drawn from the army for that purpose, they remained with the main body of their forces at Tunis, and thereby cut off all communication betwixt Carthage and the continent of Africa. By this means the capital was kept in a kind of blockade. The Africans likewise harassed them by perpetual alarms, advancing to the very walls of Carthage

Carthage.

90
The mercenaries
declare war.

- Carthage. thage by day as well as by night, and treating with the utmost cruelty every Carthaginian that fell into their hands.
- 91 They are defeated by Hanno. Hanno was dispatched to the relief of Utica with a good body of forces, 100 elephants, and a large train of battering engines. Having taken a view of the enemy, he immediately attacked their entrenchments, and, after an obstinate dispute, forced them. The mercenaries lost a vast number of men; and consequently the advantages gained by Hanno were so great, that they might have proved decisive, had he made a proper use of them: But becoming secure after his victory, and his troops being every where off their duty, the mercenaries, having rallied their forces, fell upon him, cut off a vast number of his men, forced the rest to fly into the town, retook and plundered the camp, and seized all the provisions, military stores, &c. brought to the relief of the besieged. Nor was this the only instance of Hanno's military incapacity. Notwithstanding he lay encamped in the most advantageous manner near a town called *Corza*, at which place he twice overthrew the enemy, and had it in his power to have totally ruined them, he yet neglected to improve those advantages, and even suffered the mercenaries to possess themselves of the isthmus which joined the peninsula on which Carthage stood, to the continent of Africa.
- 92 He is in his turn defeated. These repeated mistakes induced the Carthaginians once more to place Hamilcar Barca at the head of their forces. He marched against the enemy with 10,000 men, horse and foot; being all the troops the Carthaginians could then assemble for their defence, a full proof of the low state to which they were at that time reduced. As Mathos, after he had possessed himself of the isthmus, had posted proper detachments in two passes on two hills facing the continent, and guarded the bridge over the Bragada, which through Hanno's neglect he had taken, Hamilcar saw little probability of engaging him upon equal terms, or indeed of coming at him. Observing, however, that on the blowing of certain winds the mouth of the river was choked up with sand, so as to become passable, though with no small difficulty, as long as these winds continued; he halted for some time at the river's mouth, without communicating his design to any person. As soon as the wind favoured his intended project, he passed the river privately by night, and immediately after his passage he drew up the troops in order of battle, and advancing into the plain where his elephants were capable of acting, moved towards Mathos, who was posted at the village near the bridge. This daring action greatly surprised and intimidated the Africans. However, Spendius, receiving intelligence of the enemy's motions, drew a body of 10,000 men out of Mathos's camp, with which he attended Hamilcar on one side, and ordered 15,000 from Utica to observe him on the other, thinking by this means to surround the Carthaginians, and cut them all off at one stroke. By feigning a retreat, Hamilcar found means to engage them at a disadvantage; and gave them a total overthrow, with the loss of 6000 killed, and 2000 taken prisoners. The rest fled, some to the town at the bridge, and others to the camp at Utica. He did not give them time to
- recover from their defeat, but pursued them to the town near the bridge before-mentioned; which he entered without opposition, the mercenaries flying in great confusion to Tunis; and upon this many towns submitted of their own accord to the Carthaginians, whilst others were reduced by force.
- Notwithstanding these disasters, Mathos pushed on the siege of Hippo with great vigour, and appointed Spendius and Autaritus, commanders of the Gauls, with a strong body to observe the motions of Hamilcar. These two commanders, therefore, at the head of a choice detachment of 6000 men drawn out of the camp at Tunis, and 2000 Gallic horse, attended the Carthaginian general, approaching him as near as they could with safety, and keeping close to the skirts of the mountains. At last Spendius, having received a strong reinforcement of Africans and Numidians, and possessing himself of all the heights surrounding the plain in which Hamilcar lay encamped, resolved not to let slip so favourable an opportunity of attacking him. Had a battle now ensued, Hamilcar and his army must in all probability have been cut off; but by the desertion of one Naravasis, a young Numidian nobleman, with 2000 men, he found himself enabled to offer his enemies battle. The fight was obstinate and bloody; but at last the mercenaries were entirely overthrown, with the loss of 10,000 men killed, and 4000 taken prisoners. All the prisoners that were willing to enlist in the Carthaginian service, Hamilcar received among his troops, supplying them with the arms of the soldiers who had fallen in the engagement. To the rest he gave full liberty to go where they pleased; upon condition that they should never for the future bear arms against the Carthaginians; informing them at the same time, however, that as many violators of this agreement as fell into his hands must expect to find no mercy.
- Mathos and his associates, fearing that this affected lenity of Hamilcar might occasion a desertion among the troops, thought that the best expedient would be to put them upon some action so execrable in its nature that no hopes of reconciliation might remain. By their advice, therefore, Gilco and all the Carthaginian prisoners were put to death; and when Hamilcar sent to demand the remains of his countrymen, he received for answer, that whoever presumed hereafter to come upon that errand should meet with Gilco's fate: after which they came to a resolution to treat with the same barbarity all such Carthaginians as should fall into their hands. In return for this enormity, Hamilcar threw all the prisoners that fell into his hands to be devoured by wild beasts; being convinced that compassion served only to make his enemies more fierce and untractable.
- The war was now carried on generally to the advantage of the Carthaginians; nevertheless the malecontents still found themselves in a capacity to take the field with an army of 50,000 men. They watched Hamilcar's motions; but kept on the hills, carefully avoiding to come down into the plains, on account of the Numidian horse and Carthaginian elephants. Hamilcar, being much superior in skill to any of their generals, at last shut them up in a post so situated that it was impossible to get out of it. Here
- 93 Mercenaries again defeated.
- 96 They put to death all the Carthaginian prisoners.

Carthage.

97
They are
besieged by
Hamilcar.

he kept them strictly besieged; and the mercenaries, not daring to venture a battle, began to fortify their camp, and surround it with ditches and intrenchments. They were soon pressed by famine so forcibly, that they were obliged to eat one another; but they were driven desperate by the consciousness of their guilt, and therefore did not desire any terms of accommodation. At last, being reduced to the utmost extremity of misery, they insisted that Spendius, Autaritus, and Zaxas, their leaders, should in person have a conference with Hamilcar, and make proposals to him. Peace was accordingly concluded upon the following terms, *viz.* That ten of the ringleaders of the malecontents should be left entirely to the mercy of the Carthaginians; and that the troops should all be disarmed, every man retiring only in a single coat. The treaty was no sooner concluded, than Hamilcar, by virtue of the first article, seized upon the negotiators themselves; and the army being informed that their chiefs were under arrest, had immediately recourse to arms, as suspecting they were betrayed; but Hamilcar, drawing out his army in order of battle, surrounded them, and either cut them to pieces, or trod them to death with his elephants. The number of wretches who perished on this occasion, amounted to above 40,000.

98
42,000 of
them de-
stroyed.

After the destruction of this army, Hamilcar invaded Tunis, whither Mathos had retired with all his remaining forces. Hamilcar had another general, named Hannibal, joined in the command with him. Hannibal's quarter was on the road leading to Carthage, and Hamilcar's on the opposite side. The army was no sooner encamped, than Hamilcar caused Spendius, and the rest of the prisoners, to be led out in the view of the besieged, and crucified near the walls. Mathos, however, observing that Hannibal did not keep so good a guard as he ought to have done, made a sally, attacked his quarters, killed many of his men, took several prisoners, among whom was Hannibal himself, and plundered his camp. Taking the body of Spendius from the cross, Mathos immediately substituted Hannibal in its room; and 30 Carthaginian prisoners of distinction were crucified around him. Upon this disaster, Hamilcar immediately decamped, and posted himself along the sea-coast, near the mouth of the river Bagrada.

99
Hannibal
taken and
crucified by
Mathos.

The senate, though greatly terrified by this unexpected blow, omitted no means necessary for their preservation. They sent 30 senators, with Hanno at their head, to consult with Hamilcar about the proper measures for putting an end to this unnatural war, conjuring, in the most pressing manner, Hanno to be reconciled to Hamilcar, and to sacrifice his private resentment to the public benefit. This, with some difficulty, was effected; and the two generals came to a full resolution to act in concert for the good of the public. The senate, at the same time, ordered all the youth capable of bearing arms to be pressed into the service; by which means a strong reinforcement being sent to Hamilcar, he soon found himself in a condition to act offensively. He now defeated the enemy in all encounters, drew Mathos into frequent ambuscades, and gave him one notable overthrow near Leptis. This reduced the rebels to

100
Mathos en-
tirely de-
feated and
taken pri-
soner.

the necessity of hazarding a decisive battle, which proved fatal to them. The mercenaries fled almost at the first onset; most of their army fell in the field of battle, and in the pursuit. Mathos, with a few, escaped to a neighbouring town, where he was taken alive, carried to Carthage, and executed; and then, by the reduction of the revolted cities, an end was put to this war, which, from the excesses of cruelty committed in it, according to Polybius, went among the Greeks by the name of the *inexpiable war*.

During the Libyan war, the Romans, upon some absurd pretences, wrested the island of Sardinia from the Carthaginians; which the latter, not being able to resist, were obliged to submit to. Hamilcar finding his country not in a condition to enter into an immediate war with Rome, formed a scheme to put it on a level with that haughty republic. This was by making an entire conquest of Spain, by which means the Carthaginians might have troops capable of coping with the Romans. In order to facilitate the execution of this scheme, he inspired both his son-in-law Asdrubal, and his son Hannibal, with an implacable aversion to the Romans, as the great opposers of his country's grandeur. Having completed all the necessary preparations, Hamilcar, after having greatly enlarged the Carthaginian dominions in Africa, entered Spain, where he commanded nine years, during which time he subdued many warlike nations, and amassed an immense quantity of treasure, which he distributed partly amongst his troops, and partly amongst the great men at Carthage; by which means he supported his interests with these two powerful bodies. At last, he was killed in a battle, and was succeeded by his son-in-law Asdrubal. This general fully answered the expectations of his countrymen; greatly enlarged their dominions in Spain; and built the city of New Carthage, now Carthagea. He made such progress in his conquests, that the Romans began to grow jealous. They did not, however, choose at present to come to an open rupture, on account of the apprehensions they were under of an invasion from the Gauls. They judged it most proper, therefore, to have recourse to milder methods; and prevailed upon Asdrubal to conclude a new treaty with them. The articles of it were, 1. That the Carthaginians should not pass the Iberus. 2. That the Saguntines, a colony of Zacynthians, and a city situated between the Iberus and that part of Spain subject to the Carthaginians, as well as the other Greek colonies there, should enjoy their ancient rights and privileges.

Asdrubal, after having governed the Carthaginian dominions in Spain for eight years, was treacherously murdered by a Gaul whose master he had put to death. Three years before this happened, he had written to Carthage, to desire that young Hannibal, then twenty-two years of age, might be sent to him. This request was complied with, notwithstanding the opposition of Hanno; and from the first arrival of the young man in the camp, he became the darling of the whole army. The great resemblance he bore to Hamilcar, rendered him extremely agreeable to the troops. Every talent and qualification he seemed to possess that can contribute towards forming a great man.

Carthage.

101
Hamilcar's
scheme to
equal Car-
thage with
Rome.

102
His death.

103
Asdrubal's
treaty with
the Ro-
mans.

104
He is mur-
dered.

Carthage.

105
Succeeded
by Hanni-
bal, who
makes vast
conquests
in Spain.

man. After the death of Asdrubal, he was saluted general by the army with the highest demonstrations of joy. He immediately put himself in motion; and, in the first campaign, conquered the Olcades, a nation seated near the Iberus. The next year he subdued the Vaccei, another nation in that neighbourhood. Soon after, the Carpetani, one of the most powerful nations in Spain, declared against the Carthaginians. Their army consisted of 100,000 men, with which they propoed to attack Hannibal on his return from the Vaccei; but by a stratagem they were utterly defeated, and the whole nation obliged to submit.

Nothing now remained to oppose the progress of the Carthaginian arms, but the city of Saguntum. Hannibal, however, for some time, did not think proper to come to a rupture with the Romans by attacking that place. At last he found means to embroil some of the neighbouring cantons, especially the Turdetani, or, as Apian calls them, the *Torbolæte*, with the Saguntines, and thus furnished himself with a pretence to attack their city. Upon the commencement of the siege, the Roman senate dispatched two ambassadors to Hannibal, with orders to proceed to Carthage in case the general refused to give them satisfaction. They were scarce landed, when Hannibal, who was carrying on the siege of Saguntum with great vigour, sent them word that he had something else to do than to give audience to ambassadors. At last, however, he admitted them; and, in answer to their remonstrances, told them, that the Saguntines had drawn their misfortunes upon themselves, by committing hostilities against the allies of Carthage; and at the same time desired the deputies, if they had any complaints to make of him, to carry them to the senate of Carthage. On their arrival in that capital, they demanded that Hannibal might be delivered up to the Romans to be punished according to his deserts; and this not being complied with, war was immediately declared between the two nations.

The Saguntines are said to have defended themselves for eight months with incredible bravery. At last, however, the city was taken, and the inhabitants were treated with the utmost cruelty. After this conquest, Hannibal put his African troops into winter-quarters, at New Carthage; but in order to gain their affection, he permitted the Spaniards to retire to their respective homes.

The next campaign, having taken the necessary measures for securing Africa and Spain, he passed the Iberus, subdued all the nations betwixt that river and the Pyrenees, appointed Hanno commander of all the new conquered district, and immediately began his march for Italy. Upon mustering his forces, after they had been weakened by sieges, desertion, mortality, and a detachment of 10,000 foot and 1000 horse left with Hanno to support him in his new post, he found them to amount to 50,000 foot and 9000 horse, all veteran troops, and the best in the world. As they had left their heavy baggage with Hanno, and were all light armed, Hannibal easily crossed the Pyrenees; passed by Ruscino, a frontier town of the Gauls; and arrived on the banks of the Rhone without opposition. This river he passed, notwithstanding of some opposition from the Gauls; and was for

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some time in doubt whether he should advance to engage the Romans, who, under Scipio, were bending their march that way, or continue his march for Italy. But, to the latter he was soon determined by the arrival of Magilus prince of the Boii, who brought rich presents with him, and offered to conduct the Carthaginian army over the Alps. Nothing could have happened more favourable to Hannibal's affairs than the arrival of this prince, since there was no room to doubt the sincerity of his intentions. For the Boii bore an implacable enmity to the Romans, and had even come to an open rupture with them upon the first news that Italy was threatened with an invasion from the Carthaginians.

It is not known with certainty where Hannibal began to ascend the Alps. As soon as he began his march, the petty kings of the country assembled their forces in great numbers; and taking possession of the eminences over which the Carthaginians must necessarily pass, they continued harassing them, and were no sooner driven from one eminence than they seized on another, disputing every foot of land with the enemy, and destroying great numbers of them by the advantage they had of the ground. Hannibal, however, having found means to possess himself of an advantageous post, defeated and dispersed the enemy; and soon after took their capital city, where he found the prisoners, horses, &c. that had before fallen into the hands of the enemy, and likewise corn sufficient to serve the army for three days. At last, after a most fatiguing march of nine days, he arrived at the top of the mountains. Here he encamped, and halted two days, to give his wearied troops some repose, and to wait for the stragglers. As the snow was lately fallen in great plenty, and covered the ground, this sight terrified the Africans and Spaniards, who were much affected with the cold. In order therefore to encourage them, the Carthaginian general led them to the top of the highest rock on the side of Italy, and thence gave them a view of the large and fruitful plains of Insubria, acquainting them that the Gauls, whose country they saw, were ready to join them. He also pointed out to them the place wherabout Rome stood, telling them, that by climbing the Alps, they had scaled the walls of that rich metropolis; and having thus animated his troops, he decamped, and began to descend the mountains. The difficulties they met with in their descent were much greater than those they had met with while they ascended. They had indeed no enemy to contend with, except some scattered parties that came to steal rather than to fight; but the deep snows, the mountains of ice, craggy rocks, and frightful precipices, proved more terrible than any enemy. After they had for some days marched through narrow, steep, and slippery ways, they came at last to a place which neither elephants, horses, nor men could pass. The way which lay between two precipices was exceeding narrow; and the declivity, which was very steep, had become more dangerous by the falling away of the earth. Here the guides stopped; and the whole army being terrified, Hannibal proposed at first to march round about, and attempt some other way: but all places round him being covered with snow, he found himself

10 E

reduced

Carthage.

109
He crossed
the Alps.

106
He attacks
Saguntum,

107
And takes
it.

108
He sets out
for Italy.

Carthage. reduced to the necessity of cutting a way into the rock itself, through which his men, horses, and elephants might descend. This work was accomplished with incredible labour; and then Hannibal, having spent nine days in ascending, and six in descending the Alps, gained at length Infubria, and, notwithstanding all the disasters he had met with by the way, entered the country with all the boldness of a conqueror.

Hannibal, on his entry into Infubria, reviewed his army, when he found that of the 50,000 foot with whom he set out from New Carthage five months and 15 days before, he had now but 20,000, and that his 9000 horse were reduced to 6000. His first care, after he entered Italy, was to refresh his troops; who after so long a march, and such inexpressible hardships, looked like as many skeletons raised from the dead, or savages born in a desert. He did not, however, suffer them to languish long in idleness; but, joining the Infubrians, who were at war with the Taurinians, laid siege to Taurinum, the only city in the country, and in three days time became master of it, putting all who resisted to the sword. This struck the neighbouring barbarians with such terror, that of their own accord they submitted to the conqueror, and supplied his army with all sorts of provisions.

Scipio, the Roman general, in the mean time, who had gone in quest of Hannibal on the banks of the Rhone, was surprised to find his antagonist had crossed the Alps and entered Italy. He therefore returned with the utmost expedition. An engagement ensued near the river Ticinus, in which the Romans were defeated. The immediate consequence was, that Scipio repassed that river, and Hannibal continued his march to the banks of the Po. Here he staid two days, before he could cross that river over a bridge of boats. He then sent Mago in pursuit of the enemy, who having rallied their scattered forces, and repassed the Po, were encamped at Placentia. Afterwards having concluded a treaty with several of the Gallic cantons, he joined his brother with the rest of the army, and again offered battle to the Romans: but this they thought proper to decline; and at last the consul, being intimidated by the desertion of a body of Gauls, abandoned his camp, passed the Trebia, and posted himself on an eminence near that river. Here he drew lines round his camp, and waited the arrival of his colleague with the forces from Sicily.

Hannibal being apprised of the consul's departure, sent out the Numidian horse to harass him on his march; himself moving with the main body to support them in case of need. The Numidians arriving before the rear of the Roman army had quite passed the Trebia, put to the sword or made prisoners all the stragglers they found there. Soon after, Hannibal coming up, encamped in sight of the Roman army, on the opposite bank. Here having learned the character of the consul Sempronius lately arrived, he soon brought him to an engagement, and entirely defeated him. Ten thousand of the enemy retired to Placentia; but the rest were either killed or taken prisoners. The Carthaginians pursued the flying Romans as far as the Trebia, but did not think proper to repass that river on account of the excessive cold.

Hannibal, after this action upon the Trebia, ordered the Numidians, Celtiberians, and Lusitanians, to make incursions into the Roman territories, where they committed great devastations. During his state of inaction, he endeavoured to win the affections of the Gauls, and likewise of the allies of the Romans; declaring to the Gallic and Italian prisoners, that he had no intention of making war upon them, being determined to restore them to their liberty, and protect them against the Romans: and to confirm them in their good opinion of him, he dismissed them all without ransom.

Next year, having crossed the Apennines, and penetrated into Etruria, Hannibal received intelligence that the new consul Flaminius lay encamped with the Roman army under the walls of Arretium. Having learned the true character of this general, that he was of an haughty, fierce, and rash disposition, he doubted not of being soon able to bring him to a battle. To inflame the impetuous spirit of Flaminius, the Carthaginian general took the road to Rome, and, leaving the Roman army behind him, destroyed all the country through which he passed with fire and sword; and as that part of Italy abounded with all the elegancies as well as necessities of life, the Romans and their allies suffered an incredible loss on this occasion. The rash consul was inflamed with the utmost rage on seeing the ravages committed by the Carthaginians; and therefore, immediately approached them with great temerity, as if certain of victory. Hannibal in the mean time kept on, still advancing towards Rome, having Cortona on the left hand, and the lake Thrasymenus on the right; and at last, having drawn Flaminius into an ambuscade, entirely defeated him. The general himself, with 15,000 of his men, fell on the field of battle. A great number were likewise taken prisoners, and a body of 6000 men, who had fled to a town in Etruria, surrendered to Maherbal the next day: Hannibal lost only 1500 men on this occasion, most of whom were Gauls; though great numbers, both of his soldiers and of the Romans, died of their wounds. Being soon after informed that the consul Servilius had detached a body of 4000, or, according to Appian, 8000 horse from Ariminum, to reinforce his colleague in Etruria, Hannibal sent out Maherbal, with all the cavalry, and some of the infantry, to attack him. The Roman detachment consisted of chosen men, and was commanded by Centenius a Patrician. Maherbal had the good fortune to meet with him, and after a short dispute entirely defeated him. Two thousand of the Romans were laid dead on the spot; the rest, retiring to a neighbouring eminence, were surrounded by Maherbal's forces, and obliged next day to surrender at discretion; and this disaster, happening within a few days after the defeat at the lake Thrasymenus, almost gave the finishing stroke to the Roman affairs.

The Carthaginian army was now so much troubled with a scorbutic disorder, owing to the unwholesome encampments they had been obliged to make, and the morasses they had passed through, that Hannibal found it absolutely necessary to repose them for some time in the territory of Adria, a most pleasant and fertile

Carthage.

113 They are utterly defeated near the lake Thrasymenus.

110 Taurinum taken.

111 The Romans defeated near the Ticinus.

112 They are again defeated.

114 A Roman detachment cut to pieces or taken.

Carthage.

Carthage.

fertile country. In his various engagements with the Romans, he had taken a great number of their arms, with which he now armed his men after the Roman manner. Being now likewise master of that part of the country bordering on the sea, he found means to send an express to Carthage with the news of the glorious progress of his arms. The citizens received this news with the most joyful acclamations, at the same time coming to a resolution to reinforce their armies both in Italy and Spain with a proper number of troops.

115
Fabius Maximus named dictator.

The Romans being now in the utmost consternation, named a dictator, as was their custom in times of great danger. The person they chose to this office was Fabius Maximus, surnamed *Verrucosus*; a man as cool and cautious as Sempronius and Flaminius were warm and impetuous. He set out with a design not to engage Hannibal, but only to watch his motions, and cut off his provisions, which he knew was the most proper way to destroy him in a country so far from his own. Accordingly he followed him through Umbria and Picenum, into the territory of Adria, and then through the territories of the Marrucini and Frentani into Apulia. When the enemy marched, he followed them; when they encamped, he did the same; but for the most part on eminences, and at some distance from their camp, watching all their motions, cutting off their stragglers, and keeping them in a continual alarm. This cautious method of proceeding greatly distressed the Carthaginians, but at the same time raised discontents in his own army. But neither these discontents, nor the ravages committed by Hannibal, could prevail upon Fabius to alter his measures. The former therefore entered Campania, one of the finest countries of Italy. The ravages he committed there, raised such complaints in the Roman army, that the dictator, for fear of irritating his soldiers, was obliged to pretend a desire of coming to an engagement. Accordingly he followed Hannibal with more expedition than usual; but at the same time avoided, under various pretences, an engagement with more care than the enemy sought it. Hannibal finding he could not by any means bring the dictator to a battle, resolved to quit Campania, which he found abounding more with fruit and wine than corn, and to return into Samnium through the pass called Eribanus. Fabius concluding from his march that this was his design, got there before him, and encamped on Mount Callicula, which commanded the pass, after having placed several bodies in all the avenues leading to it.

116
He is outwitted by Hannibal.

Hannibal was for some time at a loss what to do; but at last contrived the following stratagem, which Fabius could not foresee nor guard against. Being encamped at the foot of Mount Callicula, he ordered Afridubal to pick out of the cattle taken in the country, 2000 of the strongest and nimblest oxen, to tie faggots to their horns, and to have them and the herdsmen ready without the camp. After supper, when all was quiet, the cattle were brought in good order to the hill, where Fabius had placed some Roman parties in ambush to stop the pass. Upon a signal given, the faggots on the horns of the oxen

were set on fire; and the herdsmen, supported by some battalions armed with small javelins, drove them on quietly. The Romans seeing the light of the fires, imagined that the Carthaginians were marching by torch-light. However, Fabius kept close in his camp, depending on the troops he had placed in ambush; but when the oxen, feeling the fire on their heads, began to run up and down the hills, the Romans in ambush thinking themselves surrounded on all sides, and climbing the ways where they saw least light, returned to their camp leaving the pass open to Hannibal. Fabius, though rallied by his soldiers for being thus over-reached by the Carthaginian, still continued to pursue the same plan, marched directly after Hannibal, and encamped on some eminences near him.

Soon after this, the dictator was recalled to Rome; and as Hannibal, notwithstanding the terrible ravages he had committed, had all along spared the lands of Fabius, the latter was suspected of holding a secret correspondence with the enemy. In his absence, Minucius, the general of the horse, gained some advantages, which greatly tended to increase the discontent with the dictator, inasmuch that before his return Minucius was put upon an equal footing with himself. The general of the horse proposed that each should command his day; but the dictator chose rather to divide the army, hoping by that means to save at least a part of it. Hannibal soon found means to draw Minucius to an engagement, and, by his masterly skill in laying ambushes, the Roman general was surrounded on every side, and would have been cut off with all his troops, had not Fabius hastened to his assistance and relieved him. Then the two armies uniting, advanced in good order to renew the fight: but Hannibal, not caring to venture a second action, founded a retreat, and retired to his camp; and Minucius, being ashamed of his rashness, resigned the command of the army to Fabius.

117
Minucius in great danger, is relieved by Fabius.

The year following, the Romans augmented their army to 87,000 men, horse and foot; and Hannibal being reduced to the greatest straits for want of provisions, resolved to leave Samnium, and penetrate into the heart of Apulia. Accordingly he decamped in the night; and by leaving fires burning, and tents standing in his camp, made the Romans believe for some time that his retreat was only feigned. When the truth was discovered, Æmilius was against pursuing him: but Terentius, contrary to the opinion of all the officers in the army, except the proconsul Servilius, was obstinately bent on following the enemy; and overtook them at Cannæ, till this time an obscure village in Apulia*. A battle ensued in this place, as memorable as any mentioned in history; in which the Romans, though almost double in number to the Carthaginians, were put to flight with most terrible slaughter; at least 45,000 of them being left dead on the field of battle, and 10,000 taken prisoners in the action or pursuit. The night was spent in Hannibal's camp in feasting and rejoicings, and next day in stripping the dead bodies of the unhappy Romans; after which the victorious general invited their two camps, where he found 4000 men.

118
The Romans utterly defeated at Cannæ.

* See Liv. 26.

Carthage.

119
Consequences
of this
victory.

The immediate consequence of this victory, as Hannibal had foreseen, was a disposition of that part of Italy called the Old province, Mægia Græcia, Tarentum, and part of the territory of Capua, to submit to him. The neighbouring provinces likewise discovered an inclination to shake off the Roman yoke, but wanted first to see whether Hannibal was able to protect them. His first march was into Samnium, being informed that the Hirpini and other neighbouring nations were disposed to enter into an alliance with the Carthaginians. He advanced to Compsa, which opened its gates to him. In this place he left his heavy baggage, as well as the immense plunder he had acquired. After which he ordered his brother Mago with a body of troops destined for that purpose to possess himself of all the fortresses in Campania, the most delicious province of Italy. The humanity Hannibal had all along shewn the Italian prisoners, as well as the fame of the complete victory he had lately obtained, wrought so powerfully upon the Lucani, Bruttii, and Apulians, that they expressed an eager desire of being taken under his protection. Nay, even the Campanians themselves, a nation more obliged to the Romans than any in Italy, except the Latins, discovered an inclination to abandon their natural friends. Of this the Carthaginian general receiving intelligence, he bent his march towards Capua, not doubting, but that, by means of the popular faction there, he should easily make himself master of it; which accordingly happened. Soon after this place had made its submission, many cities of the Bruttii opened their gates to Hannibal, who ordered his brother Mago to take possession of them. Mago was then dispatched to Carthage, with the important news of the victory at Cannæ, and the consequences attending it. Upon his arrival there he acquainted the senate, that Hannibal had defeated six Roman generals, four of which were consuls, one dictator, and the other general of horse to the dictator: that he had engaged six consular armies, killed two consuls, wounded one, and driven another out of the field with scarce 50 men to attend him: that he had routed the general of the horse, who was of equal power with the consuls; and that the dictator was esteemed the only general fit to command an army, merely because he had not the courage to engage him: and as a demonstrative proof of what he advanced, he produced, according to some authors, three bushels and an half of gold rings, taken from knights and senators who had been killed in the various engagements.

122
Tactical
superiority
of every
other
general
mentioned
in history.

Hitherto we have seen Hannibal surprisingly victorious; and, indeed, if we consider what he had already done, we shall find his exploits superior to those of any other general, either ancient or modern. Other commanders have been celebrated for victories gained over barbarous and uncivilized nations. Alexander the Great invaded and over-ran the empire of Persia; but that kingdom was then sink in sloth and effeminacy, so as to be an easy conquest; but had the great commander turned his arms against the western nations who were of a more martial disposition, it is more than probable, he had not conquered so easily. Hannibal, on the other hand, lived at a time when the Romans were not only the most powerful, but the

most warlike nation in the whole world. That nation he attacked with an army of only 26,000 men, without resources either for recruits, money, or provisions, except what he could procure in the enemies country. With these he had for three years resisted the Roman armies, which had been hitherto invincible by all other nations. Their armies had been commanded by generals of different tempers, dispositions, and abilities: the losses they sustained, are by the Roman writers imputed to the faults of the generals themselves; but experience had abundantly shewn, that these commanders with all their faults were able to conquer the most warlike nations, when commanded by another than Hannibal. In the battles fought with the Romans he had destroyed 200,000 of their men, and taken 50,000 prisoners; yet from the time of the battle of Cannæ, the affairs of this great man totally declined. The reason of this is, by the Roman historians, said to be, that when he put his army into winter-quarters in Capua, he so enervated himself and his army by debaucheries in that place, that he became no longer capable of coping with the Roman forces. But this seems by no means to have been the case; for the Roman historians themselves own, that, after the battle of Cannæ, he gave their armies many and terrible defeats, and took a great number of towns in their flight.

The true reason of that reverse of fortune, which Hannibal now experienced, was his not having sufficient resources for recruiting his army. On the first news, indeed, of his success at Carthage, a body of 4000 Numidian cavalry, 40 elephants, and 1000 talents of silver, were granted by the senate. A large detachment of Spanish forces was also appointed to follow them; and that these last might be ready in due time, Mago set out immediately for Spain to raise 20,000 foot and 4000 horse there. Had this ample supply been sent with proper expedition, it is by no means probable that the Romans would have had any occasion to reflect upon Hannibal's conduct at Capua. That general would undoubtedly have obliged the haughty republic to submit to the superior force of his arms the next campaign. But, notwithstanding the influence of the Barcinian faction at Carthage, Hanno and his adherents found means not only to retard the march of the supplies intended, but even to diminish their number. Mago, through the artifices of that insatiable party, could obtain an order for only 12,000 foot and 2500 horse, and even with this inconsiderable body of troops he was sent into Spain. Hannibal being thus deserted by his country, found himself obliged to act on the defensive; his army amounting to no more now than 26,000 foot and 9000 horse. But though obliged to act in this manner, he was only hindered from conquering; the utmost efforts of the whole Roman power not being able to drive this small army out of Italy for more than 14 years.

The Romans, though greatly reduced, were not yet exhausted. They were able still to send two consular armies into the field, fully recruited and in good order; and as neither the Gauls nor Italians were natural allies of the Carthaginians, they did not fail to abandon them on the first reverse of fortune. After

Carthage.

123
Cause of
the decline
of his af-
fairs.

124
Measures
taken by
the Ro-
mans.

the

Carthage.

the Romans had recovered from the consternation into which they were thrown by the defeat at Cannæ, they chose a dictator, and recalled Marcellus, the conqueror of Syracuse, from Sicily. All the young Romans, above 17 years of age, of what rank soever, were obliged to enlist themselves; as were also those who had already served their legal time. By this means four legions and 10,000 horse were soon raised in the city. The allies of Rome, the colonies, and the municipia, furnished the contingents as usual. To these were added 8000 of the youngest and strongest slaves in the city. The republic purchased them of their masters, but did not oblige them to serve without their own consent, which they gave, by answering *Volo*, "I am willing;" whence they were called *volentes*, to distinguish them from the other troops. As the Romans, after the loss of so many battles, had no swords, darts, or bucklers, left in their magazines, the *volentes* were supplied with the arms which had been formerly taken from the enemy, and hung up in the public temples and porticoes. The finances of Rome were no less exhausted; but this defect was supplied by the liberality of her citizens. The senators shewing the example, were followed first by the knights, and afterwards by all the tribes; who stripping themselves of all the gold they had, brought it to the public treasury. The senators only reserved their rings, and the *bullæ* about their childrens necks. As for the silver coin, it was now, for the first time, alloyed with copper, and increased in its value. Thus the finances were put into a good condition, and a competent army raised.

This was plainly the last effort the Romans could make; and could Hannibal have procured a sufficient supply of men and money to enable him to cope with this army, and to break it as he had done the others before, there could have been no more resistance made on their part. He began, however, to be in want of money; and to procure it, gave the Roman prisoners leave to redeem themselves. These unhappy men agreed to send ten of their body to Rome to negotiate their redemption; and Hannibal required no other security for their return but their oath. Carthalo was sent at the head of them to make proposals of peace; but upon the first news of his arrival, the dictator sent a lieger to him, commanding him immediately to depart the Roman territory, and it was resolved not to redeem the captives. Upon this Hannibal sent the most considerable of them to Carthage; and of the rest he made gladiators, obliging them to fight with one another, even relations with relations, for the entertainment of his troops.

All this time Cneius and Publius Scipio had carried on the war in Spain with great success against the Carthaginians. Adrubal had been ordered to enter Italy with his army to assist Hannibal; but being defeated by the Romans, was prevented. The dictator and senate of Rome, encouraged by this news, carried on the preparations for the next campaign with the greatest vigour, whilst Hannibal remained inactive at Capua. This inaction, however, seems to have proceeded from his expectation of succours from Africa, which never came, and which delay

occasioned his ruin. The Roman dictator now revealed from prison all criminals, and persons confined for debt, who were willing to enlist themselves. Of these he formed a body of 6000 foot, armed with the broad swords and bucklers formerly taken from the Gauls. Then the Roman army, to the number of about 25,000 men, marched out of the city, under the command of the dictator; while Marcellus kept the remains of Varro's army, amounting to about 15,000 men, at Casilinum, in readiness to march whenever there should be occasion.

Thus the Roman forces were still superior to those of Hannibal; and as they now saw the necessity of following the example of Fabius Maximus, no engagement of any consequence happened the first year after the battle of Cannæ. Hannibal made a fruitless attempt upon Nola, expecting it would be delivered up to him; but this was prevented by Marcellus who had entered that city, and falling unexpectedly from three gates, upon the Carthaginians, obliged them to retire in great confusion, with the loss of 5000 men. This was the first advantage that had been gained by the Romans where Hannibal had commanded in person, and raised the spirits of the former not a little. They were, however, greatly deceived, on hearing that the consul Posthumius Albinus, with his whole army, had been cut off by the Boii, as he was crossing a forest. Upon this it was resolved to draw all the Roman forces out of Gaul and other countries, and turn them against Hannibal; so that the Carthaginian stood daily more and more in need of those supplies, which yet never arrived from Carthage. He reduced, however, the cities of Nuceria, Casilinum, Petelia, Consentia, Croton, Locri, and several others in Great Greece, before the Romans gained any advantage over him, except that before Nola already mentioned. The Campanians, who had espoused the Carthaginian interest, raised an army of 14,000 of their own nation in favour of Hannibal, and put one Marius Albius at the head of it; but he was surprised by the consul Sempiternus, who defeated and killed him, with 2000 of his men. It was now found, that Hannibal had concluded a treaty of alliance, offensive and defensive, with Philip king of Macedon; but to prevent any disturbance from that quarter, a Roman army was sent to Macedon. Soon after this Marcellus defeated Hannibal in a pitched battle, having armed his men with long pikes used generally at sea, and chiefly in boarding of ships; by which means the Carthaginians were pierced through, while they were totally unable to hurt their adversaries with the short javelins they carried. Marcellus pursued them close; and, before they got to their camp, killed 5000, and took 600 prisoners; losing himself about 1000 men, who were trod down by the Numidian horse, commanded by Hannibal in person. After this defeat the Carthaginian general found himself deserted by 1200 of his best horse, partly Spaniards, and partly Numidians, who had crossed the Alps with him. This touched him so sensibly, that he left Campania, and retired into Apulia.

The Romans still continued to increase their forces; and Hannibal, not having the same resources, found it impossible to act against so many armies at once.

Fabius

Carthage.

127

Marcellus gains an advantage over Hannibal.

128

Hannibal takes several cities.

129

He is defeated by Marcellus.

130

He is deserted by a party of his horse.

125
They refuse to treat of peace.

126
Adrubal defeated by the Romans in Spain.

Carthage.

121
He is again
defeated,
and begins
to lose
ground.

Fabius Maximus advanced into Campania, whither Hannibal was obliged to return in order to save Capua. He ordered Hanno, however, at the head of 17,000 foot and 1700 horse, to seize Beneventum; but he was utterly defeated, scarce 2000 of his men being left alive. Hannibal himself, in the mean time, advanced to Nola, where he was again defeated by Marcellus. He now began to lose ground; the Romans retook Casilinum, Acqua in Apulia, Arpi, and Aternum; but the city of Tarentum was delivered up to him by its inhabitants. The Romans then entered Campania, and ravaged the whole country, threatening Capua with a siege. The inhabitants immediately acquainted Hannibal with their danger; but he was so intent upon reducing the citadel of Tarentum, that he could not be prevailed upon to come to their assistance. In the mean time Hanno was again utterly defeated by Fulvius, his camp taken, and he himself forced to fly into Brutium with a small body of horse. The consuls then advanced with a design to besiege Capua in form. But in their way, Sempronius Gracchus, a man of great bravery, and an excellent general, was betrayed by a Lucanian and killed, which proved a very great detriment to the republic. Capua, however, was soon after invested on all sides; and the besieged once more sent to Hannibal, who now came to their assistance with his horse, his light armed infantry, and 33 elephants. He found means to inform the besieged of the time he designed to attack the Romans, ordering them to make a vigorous sally at the same time. The Roman generals, Appius and Fulvius, upon the first news of the enemy's approach, divided their troops, Appius taking upon him to make head against the garrison, and Fulvius to defend the intrenchments against Hannibal. The former found no difficulty in repulsing the garrison; and would have entered the city with them, had he not been wounded at the very gate, which prevented him from pursuing his design. Fulvius found it more difficult to withstand Hannibal, whose troops behaved themselves with extraordinary resolution. A body of Spaniards and Numidians had even the boldness to pass the ditch, and, in spite of all opposition, climbing the ramparts, penetrated into the Roman camp; but not being properly seconded by the rest, they were all to a man cut in pieces. The Carthaginian general was so disheartened at this, especially after the garrison was repulsed, that he found a retreat, which was made in good order.

124
He marches
to Rome.

125
He surprises
and defeats
Appius.

His next attempt for the relief of Capua was to march to Rome, where he hoped his approach would strike so much terror, that the armies would be called from before Capua; and that the Capuans might not be disheartened by his sudden departure, he found means to acquaint them with his design. The news of his approach caused great consternation in the metropolis. Some of the senators were for calling all the armies in Italy into the neighbourhood of Rome, as thinking nothing less was able to resist the terrible Carthaginian. But Fabius told them that Hannibal's design was not to take Rome, but relieve Capua; upon which Fulvius was recalled to Rome with 15,000 foot, and 1000 horse; and this obliged Hannibal again to retire. He then returned before Capua so suddenly,

that he surprised Appius in his camp, drove him out of it with the loss of a great number of men, and obliged him to entrench himself on some eminences, where he expected to be soon joined by his colleague Fulvius. As Hannibal, however, now expected to have all the Roman forces upon him, he could do nothing more for the relief of Capua, which was, of consequence, obliged to submit to the Romans.

A little before the surrender of Capua, Hannibal came up with a Roman army commanded by one M. Centenius Penula, who had signalized himself on many occasions as a centurion. This rash man, being introduced to the senate, had the assurance to tell them, that if they would trust him with a body of only 5000 men, he would give a good account of Hannibal. They gave him 8000, and his army was soon increased to double that number. He engaged the Carthaginians on Hannibal's first offering him battle; but after an engagement of two hours, was defeated, himself and all his men being slain, except about 1000. Soon after, having found means to draw the praetor Cneius Fulvius into an ambuscade, Hannibal cut in pieces almost his whole army, consisting of 18,000 men. In the mean time Marcellus was making great progress in Samnium. The city of Salapia was betrayed to him; but he took other two by assault. In the last of these he found 3000 Carthaginians, whom he put to the sword; and carried off 240,000 bushels of wheat, and 110,000 of barley. This, however, was by no means a compensation for the defeat which Hannibal soon after gave the proconsul Fulvius Centumalus, whom he surprised and cut off, with 13,000 of his men.

After this defeat, the great Marcellus advanced with his army to oppose Hannibal. Various engagements happened without any thing decisive. In one of them the Romans are said to have been defeated, and in another Hannibal; but, notwithstanding these, it was neither in the power of Marcellus, nor any other Roman general, totally to defeat or disperse the army commanded by Hannibal in person. Nay, in the eleventh year of the war, Hannibal found means to decoy into an ambuscade, and cut off, the great Marcellus himself; the consequence of which was, that the Romans were obliged to raise the siege of Locri, with the loss of all their military engines.

Hitherto the Carthaginians, though no longer the favourites of fortune, had lost but little ground; but now they met with a blow which totally ruined their affairs. This was the defeat of Afrubal, Hannibal's brother, who had left Spain, and was marching to his assistance. He crossed the Pyrenees without any difficulty; and, as the silver mines had supplied him with a very considerable quantity of treasure, he not only prevailed upon the Gauls to grant him a passage through their territories, but likewise to furnish him with a considerable number of recruits. Meeting with many favourable circumstances to expedite his march, he arrived at Placentia sooner than the Romans, or even his brother Hannibal, expected. Had he continued to use the same expedition with which he set out, and hastened to join his brother, it would have been utterly impossible to have saved Rome; but, sitting

Carthage.

126
Capua sub-
mitted to the
Romans.

127
Centenius
Penula de-
feated by
Hannibal.

128
As also the
praetor
Fulvius,

129
And the
pro-consul
Fulvius
Centuma-
lus.

130
Marcellus
drawn into
an ambu-
cade and
killed.

131
Carthagi-
nian affairs
totally ru-
ined by the
defeat of
Afrubal.

Carthage.

Carthage.

ting down before Placentia, he gave the Romans an opportunity of assembling all their forces to attack him. At last he was obliged to raise the siege, and began his march for Umbria. He sent a letter to acquaint his brother of his intended motion : but the messenger was intercepted ; and the two consuls, joined their armies, with united forces fell upon the Carthaginians. As the latter were inferior both in numbers and resolution, they were utterly defeated, and Asdrubal was killed. About the same time, Hannibal himself is said to have suffered several defeats, and was retired to Canium ; but, on the fatal news of his brother's defeat and death, he was filled with despair, and retired to the extremity of Brutium ; where, assembling all his forces, he remained for a considerable time in a state of inaction, the Romans not daring to disturb him, so formidable did they esteem him alone, though every thing about him went to wreck, and the Carthaginian affairs seemed not far from the verge of destruction. Livy tells us, that it was difficult to determine whether his conduct was more wonderful in prosperity or in adversity. Notwithstanding which, Brutium being but a small province, and many of its inhabitants being either forced into the service, or forming themselves into parties of banditti, so that a great part of it remained uncultivated, he found it a difficult matter to subsist there, especially as no manner of supplies were sent him from Carthage. The people there were as solicitous about preserving their possessions in Spain, and as little concerned about the situation of affairs in Italy, as if Hannibal had met with an uninterrupted course of success, and no disaster befallen him since he first entered that country.

142
The great
progress of
Scipio Africanus.

All their solicitude, however, about the affairs of Spain, was to no purpose ; their generals, one after another, were defeated by the Romans. They had indeed cut off the two Scipios ; but found a much more formidable enemy in the young Scipio, afterwards famous *Africanus*. He overthrew them in conjunction with Masinissa king of Numidia ; and the latter, thereafter, abandoned their interest. Soon after, Syphax, king of the Massylii, was likewise persuaded to abandon their party. Scipio also gave the Spanish Reguli a great overthrow ; and reduced the cities of New Carthage, Gades, and many other important places. At last the Carthaginians began to open their eyes when it was too late. Mago was ordered to abandon Spain, and sail with all expedition to Italy. He landed on the coast of Liguria with an army of 12,000 foot and 2000 horse ; where he surprised Genoa, and also seized upon the town and port of Savo. A reinforcement was sent him to this place, and new levies went on very briskly in Liguria ; but the opportunity was passed, and could not be recalled. Scipio having carried all before him in Spain, passed over into Africa, where he met with no enemy capable of opposing his progress. The Carthaginians then, seeing themselves on the brink of destruction, were obliged to recall their armies from Italy, in order to save their city. Mago, who had entered Insubria, was defeated by the Roman forces there ; and having retreated into the maritime parts of Liguria, met a courier who brought him orders to return

143
Mago lands
in Italy.

144
Scipio lands
in Africa.

145
Mago and
Hannibal
recalled.

directly to Carthage. At the same time, Hannibal was likewise recalled. When the messengers acquainted him with the senate's pleasure, he expressed the utmost indignation and concern, groaning, gnashing his teeth, and scarce refraining from tears. Never banished man, according to Livy, shewed so much regret in quitting his native country, as Hannibal did at going out of that of the enemy.

The Carthaginian general was no sooner landed in Africa, than he sent out parties to get provisions for the army, and buy horses to remount the cavalry. He entered into a league with the Regulus of the *Areacida*, one of the Numidian tribes. Four thousand of Syphax's horse came over in a body to him ; but as he did not think proper to repose any confidence in them, he put them all to the sword, and distributed their horses among his troops. Vermina, one of Syphax's sons, and Mafetulus, another Numidian prince, likewise joined him with a considerable body of horse. Most of the fortresses in Masinissa's kingdom either surrendered to him upon the first summons, or were taken by force. Narce, a city of considerable note there, he made himself master of by stratagem. Tychæus, a Numidian Regulus, and faithful ally of Syphax, whose territories were famous for an excellent breed of horses, reinforcing him also with 2000 of his best cavalry, Hannibal advanced to Zama, a town about five days journey distant from Carthage, where he encamped. He thence sent out spies to observe the posture of the Romans. These being brought to Scipio, he was so far from inflicting any punishment upon them, which he might have done by the laws of war, that he commanded them to be led about the camp, in order to take an exact survey of it, and then dismissed them. Hannibal, admiring the noble assurance of his rival, sent a messenger to desire an interview with him ; which, by means of Masinissa, he obtained. The two generals, therefore, escorted by equal detachments of horse, met at Nádagara, where, by the assistance of two interpreters, they held a private conference. Hannibal flattered Scipio in the most refined and artful manner, and expatiated upon all those topics which, he thought, could influence that general to grant his nation a peace upon tolerable terms ; amongst other things, that the Carthaginians would willingly confine themselves to Africa, since such was the will of the gods, in order to procure a lasting peace, whilst the Romans would be at liberty to extend their conquests to the remotest nations. Scipio answered, that the Romans were not prompted by ambition, or any sinister views, to undertake either the former or present war against the Carthaginians ; but by justice, and a proper regard for their allies. He also observed, that the Carthaginians had, before his arrival in Africa, not only made him the same proposals, but likewise agreed to pay the Romans 5000 talents of silver, to restore all the Roman prisoners without ransom, and deliver up all their galleys. He insisted on the pernicious conduct of the Carthaginians, who had broke a truce concluded with them ; and told him, that so far from granting them more favourable terms, they ought to expect more rigorous ones ; which if Hannibal would submit to, a peace would ensue ;

146
Hannibal's
proceedings
after
his arrival
in Africa.

147
He has an
interview
with Scipio.

Carthage.

148
The battle
of Zama.

* See Zama.

149
Hannibal
totally
routed.150
Peace con-
cluded.151
Carthagini-
ans oppres-
sed by Ma-
nusilla.

enue; if not, the decision of the dispute must be left to the sword.

This conference, betwixt two of the greatest generals the world ever produced, ending without success, they both retired to their respective camps; where they informed their troops, that not only the fate of Rome and Carthage, but that of the whole world, was to be determined by them the next day. An engagement ensued*, in which, as Polybius informs us, the surprising military genius of Hannibal displayed itself in an extraordinary manner. Scipio likewise, according to Livy, passed an high encomium upon him, on account of his uncommon capacity in taking advantages, the excellent arrangement of his forces, and the manner in which he gave his orders during the engagement. The Roman general indeed, not only approved his conduct, but openly declared that it was superior to his own. Nevertheless, being vastly inferior to the enemy in horse, and the state of Carthage obliging him to hazard a battle with the Romans at no small disadvantage, Hannibal was utterly routed, and his camp taken. He fled first to Thon, and afterwards to Adrumetum, from whence he was recalled to Carthage; where being arrived, he advised his countrymen to conclude a peace with Scipio on whatever terms he thought proper to prescribe.

Thus was the second war of the Carthaginians with the Romans concluded. The conditions of peace were very humiliating to the Carthaginians. They were obliged to deliver up all the Roman deserters, fugitive slaves, prisoners of war, and all the Italians whom Hannibal had obliged to follow him. They also delivered up all their ships of war, except ten triremes, all their tame elephants, and were to train up no more of these animals for the service. They were not to engage in any war without the consent of the Romans. They engaged to pay to the Romans, in fifty years, 10,000 Euboic talents, at equal payments. They were to restore to Masinissa all they had usurped from him or his ancestors, and to enter into an alliance with him. They were also to assist the Romans both by sea and land, whenever they were called upon so to do, and never to make any levies either in Gaul or Liguria. These terms appeared so intolerable to the populace, that they threatened to plunder and burn the houses of the nobility; but Hannibal having assembled a body of 6000 foot and 500 horse at Marthama, prevented an insurrection, and by his influence completed the accommodation.

The peace between Carthage and Rome was scarce signed, when Masinissa unjustly made himself master of part of the Carthaginian dominions in Africa, under pretence that these formerly belonged to his family. The Carthaginians, through the villainous mediation of the Romans, found themselves under a necessity of ceding these countries to that ambitious prince, and of entering into an alliance with him. The good understanding between the two powers continued for many years afterwards; but at last Masinissa violated the treaties subsisting betwixt him and the Carthaginian republic, and not a little contributed to its subversion.

After the conclusion of the peace, Hannibal still kept up his credit among his countrymen. He was intrusted with the command of an army against some neighbouring nations in Africa; but this being disagreeable to the Romans, he was removed from it, and raised to the dignity of prætor in Carthage. Here he continued for some time, reforming abuses, and putting the affairs of the republic in a better condition; but this likewise being disagreeable to the Romans, he was obliged to fly to Antiochus king of Syria. After his flight, the Romans began to look upon the Carthaginians with a suspicious eye; though, to prevent every thing of this kind, the latter had ordered two ships to pursue Hannibal, had confiscated his effects, rased his house, and by a public decree declared him an exile. Soon after, disputes arising between the Carthaginians and Masinissa, the latter, notwithstanding the manifest iniquity of his proceedings, was supported by the Romans. That prince grasping at further conquests endeavoured to embroil the Carthaginians with the Romans, by asserting that the former had received ambassadors from Perseus king of Macedon; that the senate assembled in the temple of Æsculapins in the night-time, in order to confer with them; and that ambassadors had been dispatched from Carthage to Perseus, in order to conclude an alliance with him. Not long after this, Masinissa made an irruption into the province of Tyfca, where he soon possessed himself of 70, or, as Apian will have it, 50 towns and castles. This obliged the Carthaginians to apply with great importunity to the Roman senate for redress, their hands being so tied up by an article in the last treaty, that they could not repel force by force, in case of an invasion, without their consent. Their ambassadors begged, that the Roman senate would settle once for all what dominions they were to have, that they might from thenceforth know what they had to depend upon; or if their state had any way offended the Romans, they begged that they would punish them themselves, rather than leave them exposed to the insults and vexations of so merciless a tyrant. Then prostrating themselves on the earth, they burst out into tears. But, notwithstanding the impression their speech made, the matter was left undecided; so that Masinissa had liberty to pursue his rapines as much as he pleased. But whatever villainous designs the Romans might have with regard to the republic of Carthage, they affected to shew a great regard to the principles of justice and honour. They therefore sent Cato, a man famous for committing enormities under the specious pretence of public spirit, into Africa, to accommodate all differences betwixt Masinissa and the Carthaginians. The latter very well knew their fate, had they submitted to such a mediation; and therefore appealed to the treaty concluded with Scipio, as the only rule by which their conduct and that of their adversary ought to be examined. This *unreasonable* appeal incensed the righteous Cato, that he pronounced them a devoted people, and from that time resolved upon their destruction. For some time he was opposed by Scipio Nasica; but the people of Carthage, knowing the Romans to be their inveterate enemies, and reflecting upon the iniquitous treatment they had met with

Carthage.

152
Hannibal
flies to Antiochus.153
Iniquitous
proceedings of Masinissa and the Romans.

Carthage.

with from them ever since the commencement of their disputes with Mafiniffa, were under great apprehensions of a visit from them. To prevent a rupture as much as possible, by a decree of the senate, they impeached Afrubal general of the army, and Carthalo commander of the auxiliary forces, together with their accomplices, as guilty of high treason, for being the authors of the war against the king of Numidia. They sent a deputation to Rome, to discover what sentiments were entertained there of their late conduct, and to know what satisfaction the Romans required. These messengers meeting with a cold reception, others were dispatched, who returned with the same success. This made the unhappy citizens of Carthage believe that their destruction was resolved upon; which threw them into the utmost despair. And indeed they had but too just grounds for such a melancholy apprehension, the Roman senate now discovering an inclination to fall in with Cato's measures. About the same time, the city of Utica, being the second in Africa, and famous for its immense riches, as well as its equally commodious and capacious port, submitted to the Romans. Upon the possession of so important a fortress, which, by reason of its vicinity to Carthage, might serve as a place of arms in the attack of that city, the Romans declared war against the Carthaginians without the least hesitation. In consequence of this declaration, the consuls M. Manlius Nepos, and L. Marcus Censorinus, were dispatched with an army and fleet, to begin hostilities with the utmost expedition. The land-forces consisted of 80,000 foot, and 4000 chosen horse; and the fleet of 50 quinqueremes, besides a vast number of transports. The consuls had secret orders from the senate not to conclude the operations but by the destruction of Carthage, without which, it was pretended, the republic could not but look upon all her possessions as insecure. Pursuant to the plan they had formed, the troops were first landed at Lilybæum in Sicily, from whence, after receiving a proper refreshment, it was proposed to transport them to Utica.

154
War declared by the Romans against Carthage.

The answer brought by the last ambassadors to Carthage, had not a little alarmed the inhabitants of that city. But they were not yet acquainted with the resolutions taken at Rome. They therefore sent fresh ambassadors thither, whom they invested with full powers to act as they thought proper for the good of the republic, and even to submit themselves without reserve to the pleasure of the Romans. But the most sensible persons among them did not expect any great success from this condescension, since the early submission of the Uticans had rendered it infinitely less meritorious than it would have been before. However, the Romans seemed to be in some measure satisfied with it, since they promised them their liberty, the enjoyment of their laws, and in short every thing that was dear and valuable to them. This threw them into a transport of joy, and they wanted words to extol the moderation of the Romans. But the senate immediately dashed all their hopes, by acquainting them, that this favour was granted upon condition that they would send 300 young Carthaginian noblemen of the first distinction

156
The Romans demand 300 hostages,

to the prætor Fabius at Lilybæum, within the space of 30 days, and comply with all the orders of the consuls. These hard terms filled the whole city with inexpressible grief: but the hostages were delivered; and as they arrived at Lilybæum before the 30 days were expired, the ambassadors were not without hopes of softening their hard-hearted enemy. But the consuls only told them, that upon their arrival at Utica they should learn the farther orders of the republic.

The ministers no sooner received intelligence of the Roman fleet appearing off Utica, than they repaired thither, in order to know the fate of their city. The consuls, however, did not judge it expedient to communicate all the commands of their republic at once, lest they should appear so harsh and severe, that the Carthaginians would have refused to comply with them. They first, therefore, demanded a sufficient supply of corn for the subsistence of their troops. Secondly, That they should deliver up into their hands all the tiremes they were then masters of. Thirdly, That they should put them in possession of all their military machines. And fourthly, That they should immediately convey all their arms into the Roman camp.

157
And all the Carthaginians arms, military machines, &c.

As care was taken that there should be a convenient interval of time betwixt every one of these demands, the Carthaginians found themselves ensnared, and could not reject any one of them, though they submitted to the last with the utmost reluctance and concern. Censorinus now imagining them incapable of sustaining a siege, commanded them to abandon their city, or, as Zonaras will have it, to demolish it; permitting them to build another 80 stadia from the sea, but without walls or fortifications. This terrible decree threw the senate and every one else into despair; and the whole city became a scene of horror, madness, and confusion. The citizens cursed their ancestors for not dying gloriously in the defence of their country, rather than concluding such ignominious treaties of peace, that had been the cause of the deplorable condition to which their poverty was then reduced. At length, when the first commotion was a little abated, the senators assembled and resolved to sustain a siege. They were stripped of their arms and destitute of provisions; but despair raised their courage, and made them find out expedients. They took care to shut the gates of the city; and gathered together on the ramparts great heaps of stones, to serve them instead of arms in case of a surprise. They took the malefactors out of prison, gave the slaves their liberty, and incorporated them in the militia. Afrubal was recalled, who had been sentenced to die only to please the Romans; and he was invited to employ 20,000 men he had raised against his country, in defence of it. Another Afrubal was appointed to command in Carthage; and all seemed resolute, either to save their city or perish in its ruins. They wanted arms; but, by order of the senate, the temples, porticoes, and all public buildings, were turned into work-houses, where men and women were continually employed in making arms. As they encouraged one another in their work, and lost no time in procuring

158
They command them to destroy their city.

159
The Carthaginians resolve to sustain a siege.

160
They make new arms.

Carthage. to themselves the necessaries of life, which were brought to them at stated hours, they every day made 144 bucklers, 300 swords, 1000 darts, and 500 lances and javelins. As to ballistæ and catapultæ, they wanted proper materials for them; but their industry supplied that defect. Where iron and bræs were wanting, they made use of silver and gold, melting down the statues, vases, and even the utensils of private families; for, on this occasion, even the most covetous became liberal. As tow and flax were wanting to make cords for working the machines, the women, even those of the first rank, freely cut off their hair and dedicated it to that use. Without the walls, Aldrubal employed the troops in getting together provisions, and conveying them safe into Carthage; so that there was as great plenty there as in the Roman camp.

161
The city at-
tacked by
the Ro-
mans, who
are repul-
sed.

In the mean time the consuls delayed drawing near to Carthage, not doubting but the inhabitants, whom they imagined destitute of necessaries to sustain a siege, would, upon cool reflection, submit; but at length, finding themselves deceived in their expectation, they came before the place and invested it. As they were still persuaded that the Carthaginians had no arms, they flattered themselves that they should easily carry the city by assault. Accordingly they approached the walls in order to plant their scaling-ladders; but to their great surprise they discovered a prodigious multitude of men on the ramparts, shining in the armour they had newly made. The legionaries were so terrified at this unexpected sight, that they drew back, and would have retired, if the consuls had not led them on to the attack: which, however, proved unsuccessful; the Romans, in spite of their utmost efforts, being obliged to give over the enterprize, and lay aside all thoughts of taking Carthage by assault. In the mean time Aldrubal, having collected from all places subject to Carthage a prodigious number of troops, came and encamped within reach of the Romans, and soon reduced them to great straits for want of provisions. As Marcius, one of the Roman consuls, was posted near a marsh, the exhalations of the stagnating waters, and the heat of the season, infected the air, and caused a general sickness among his men. Marcius, therefore, ordered his fleet to draw as near the shore as possible, in order to transport his troops to an healthier place. Aldrubal being informed of this motion, ordered all the old barks in the harbour to be filled with faggots, tow, sulphur, bitumen, and other combustible materials; and then taking advantage of the wind, which blew towards the enemy, let them drive upon their ships, which were for the most part consumed. After this disaster, Marcius was called home to preside at the elections; and the Carthaginians, looking upon the absence of one of the consuls to be a good omen, made a brisk sally in the night; and would have surprised the consul's camp, had not Æmilianus, with some squadrons, marched out of the gate opposite to the place where the attack was made, and, coming round, fell unexpectedly on their rear, and obliged them to return in disorder to the city.

Aldrubal had posted himself under the walls of a

city named Nepheris, 24 miles distant from Carthage, and situated on an high mountain, which seemed inaccessible on all sides. From thence he made incursions into the neighbouring country, intercepted the Roman convoys, fell upon their detachments sent out to forage, and even ordered parties to insult the consular army in their camp. Hereupon the consul resolved to drive the Carthaginian from this advantageous post, and set out for Nepheris. As he drew near the hills, Aldrubal suddenly appeared at the head of his army in order of battle, and fell upon the Romans with incredible fury. The consular army sustained the attack with great resolution; and Aldrubal retired in good order to his post, hoping the Romans would attack him there. But the consul being now convinced of his danger, resolved to retire. This Aldrubal no sooner perceived, than he rushed down the hill, and falling upon the enemy's rear, cut a great number of them in pieces. The whole Roman army was now saved by the bravery of Scipio Æmilianus. At the head of 300 horse, he sustained the attack of all the forces commanded by Aldrubal, and covered the legions, while they passed a river in their retreat before the enemy. Then he and his companions threw themselves into the stream, and swam across it. When the army had crossed the river, it was perceived that four manipuli were wanting; and soon after they were informed that they had retired to an eminence, where they resolved to sell their lives as dear as possible. Upon this news Æmilianus, taking with him a chosen body of horse, and provisions for two days, crossed the river, and flew to the assistance of his countrymen. He seized an hill over against that on which the four manipuli were posted; and, after some hours repose, marched against the Carthaginians who kept them invested, fell upon them at the head of his squadron with the boldness of a man determined to conquer or die, and in spite of all opposition opened a way for his fellow-soldiers to escape. On his return to the army, his companions, who had given him over for lost, carried him to his quarters in a kind of triumph; and the manipuli he had saved gave him a crown of *grænen*. By these and some other exploits, Æmilianus gained such reputation, that Cato, who is said never to have commended any body before, could not refuse him the praises he deserved; and is said to have foretold that Carthage would never be reduced till Scipio Æmilianus was employed in that expedition.

The next year, the war in Africa fell by lot to the consul L. Calpurnius Piso; and he continued to employ Æmilianus in several important enterprizes, in which he was attended with uncommon success. He took several castles; and in one of his excursions, found means to have a private conference with Phæmas, general, under Aldrubal, of the Carthaginian cavalry, and brought him over, together with 2200 of his horse, to the Roman interest. Under the consul Calpurnius Piso himself, however, the Roman arms were unsuccessful. He invested Clupea; but was obliged to abandon the enterprize, with the loss of a great number of men killed by the enemy in their sallies. From this place he went to vent his

Carthage.

163
The Ro-
man army,
in great
danger, is
saved by
Scipio Æ-
milianus.

162
Part of the
Roman fleet
destroyed.

164
He gains
over the
Carthagini-
an general
of horse.

Carthage.

rage on a city newly built, and thence called *Neapolis*, which professed a strict neutrality, and had even a safeguard from the Romans. The consul, however, plundered the place, and stripped the inhabitants of all their effects. After this he laid siege to *Hippagreta*, which employed the Roman fleet and army the whole summer; and, on the approach of winter, the consul retired to Utica, without performing a single action worth notice during the whole campaign.

165
He is chosen consul.

The next year Scipio *Æmilianus* was chosen consul, and ordered to pass into Africa; and upon his arrival, the face of affairs was greatly changed. At the time of his entering the port of Utica, 3500 Romans were in great danger of being cut in pieces before Carthage. These had seized *Megalia*, one of the suburbs of the city: but as they had not furnished themselves with provisions to subsist there, and could not retire, being closely invested on all sides by the enemy's troops; the prætor *Mancinus*, who commanded this detachment, seeing the danger into which he had brought himself, dispatched a light boat to Utica, to acquaint the Romans there with his situation. *Æmilianus* received this letter a few hours after his landing; and immediately flew to the relief of the besieged Romans, obliged the Carthaginians to retire within their walls, and safely conveyed his countrymen to Utica. Having then drawn together all the troops, *Æmilianus* applied himself wholly to the siege of the capital.

166
Monstrous cruelties of Afrubal.

His first attack was upon *Megalia*; which he carried by assault, the Carthaginian garrison retiring into the citadel of *Byrfa*. *Afrubal*, who had commanded the Carthaginian forces in the field, and was now governor of the city, was so enraged at the loss of *Megalia*, that he caused all the Roman captives taken in the two years the war lasted, to be brought upon the ramparts, and thrown headlong, in the sight of the Roman army, from the top of the wall; after having, with an excess of cruelty, commanded their hands and feet to be cut off, and their eyes and tongues to be torn out. He was of a temper remarkably inhuman, and it is said that he even took pleasure in seeing some of these unhappy men flayed alive. *Æmilianus*, in the mean time, was busy in drawing lines of circumvallation and contravallation cross the neck of land which joined the isthmus on which Carthage stood to the continent. By this means, all the avenues on the land-side of Carthage being shut up, the city could receive no provisions that way. His next care was to raise a mole in the sea, in order to block up the old port, the new one being already shut up by the Roman fleet; and this great work he effected with immense labour. The mole reached from the western neck of land, of which the Romans were masters, to the entrance of the port; and was 90 feet broad at the bottom, and 80 at the top. The besieged, when the Romans first began this surprising work, laughed at the attempt; but were no less alarmed than surprised, when they beheld a vast mole appearing above water, and by that means the port rendered inaccessible to ships, and quite useless. Prompted by despair, however, the Carthaginians, with incredible and almost mira-

167
Carthage blocked up by sea and land.

168
The besieged dig a new basin.

culous industry, dug a new basin, and cut a passage into the sea, by which they could receive the provisions that were sent them by their troops in the field. With the same diligence and expedition, they fitted out a fleet of 50 triremes; which, to the great surprise of the Romans, appeared suddenly advancing into the sea through this new canal, and even ventured to give the enemy battle. The action lasted the whole day, with little advantage on either side. The day after, the consul endeavoured to make himself master of a terrace which covered the city on the side next the sea; and on this occasion the besieged signalized themselves in a most remarkable manner. Great numbers of them, naked and unarmed, went into the water in the dead of the night, with unlighted torches in their hands; and having, partly by swimming, partly by wading, got within reach of the Roman engines, they struck fire, lighted their torches, and threw them with fury against the machines. The sudden appearance of these naked men, who looked like so many monsters started up out of the sea, so terrified the Romans who guarded the machines, that they began to retire in the utmost confusion. The consul, who commanded the detachment in person, and had continued all night at the foot of the terrace, endeavoured to stop his men, and even ordered those who fled to be killed. But the Carthaginians, perceiving the confusion the Romans were in, threw themselves upon them like so many wild beasts; and having put them to flight only with their torches, they set fire to the machines, and entirely consumed them. This, however, did not discourage the consul; he renewed the attack a few days after, carried the terrace by assault, and lodged 4000 men upon it. As this was an important post, because it peep in Carthage on the sea-side, *Æmilianus* took care to fortify and secure it against the sallies of the enemy; and then, winter approaching, he suspended all further attacks upon the place till the return of good weather. During the winter-season, however, the consul was not inactive. The Carthaginians had a very numerous army under the command of one *Diogenes*, strongly encamped near *Nepheris*, whence convoys of provisions were sent by sea to the besieged, and brought into the new basin. To take *Nepheris*, therefore, was to deprive Carthage of her chief magazine. This *Æmilianus* undertook, and succeeded in the attempt. He first forced the enemy's entrenchments, put 70,000 of them to the sword, and made 10,000 prisoners; all the inhabitants of the country, who could not retire to Carthage, having taken refuge in this camp. After this, he laid siege to *Nepheris*, which was reduced in 22 days. *Afrubal* being disheartened by the defeat of the army, and touched with the misery of the besieged now reduced to the utmost extremity for want of provisions, offered to submit to what conditions the Romans pleased, provided the city was spared; but this was absolutely refused.

Early in the spring, *Æmilianus* renewed the siege of Carthage; and in order to open himself a way into the city, he ordered *Lælius* to attempt the reduction of *Cotho*, a small island which divided the two

Carthage.

169
They set fire to the Roman machines.

170
Vast slaughter of the Carthaginians.

171
Cotho taken.

Carthage.

172
Romans enter the city;

ports. *Æmilianus* himself made a false attack on the citadel, in order to draw the enemy thither. This stratagem had the desired effect; for the citadel being a place of the greatest importance, most of the Carthaginians hastened thither, and made their utmost efforts to repulse their aggressors. But in the mean time *Lælius* having, with incredible expedition, built a wooden bridge over the channel which divided *Cotho* from the isthmus, entered the island, scaled the walls of the fortrefs which the Carthaginians had built there, and made himself master of that important post. The proconsul, who was engaged before *Byrsa*, no sooner understood, by the loud shouts of the troops of *Lælius*, that he had made himself master of *Cotho*, than he abandoned the false attack, and unexpectedly fell on the neighbouring gate of the city, which he broke down, notwithstanding the showers of darts that were incessantly discharged upon his men from the ramparts. As night coming on prevented him from proceeding farther, he made a lodgment within the gate, and waited there for the return of day, with a design to advance through the city to the citadel, and attack it on that side which was but indifferently fortified. Pursuant to this design, at day-break he ordered 4000 fresh troops to be sent from his camp, and, having solemnly devoted to the infernal gods the unhappy Carthaginians, he began to advance at the head of his men, through the streets of the city, in order to attack the citadel. Having advanced to the market-place, he found that the way to the citadel lay through three exceeding steep streets. The houses on both sides were very high, and filled with Carthaginians, who overwhelmed the Romans as they advanced, with darts and stones; so that they could not proceed till they had cleared them. To this end *Æmilianus* in person, at the head of a detachment, attacked the first house, and made himself master of it sword in hand. His example was followed by the officers and soldiers, who went on from house to house, putting all they met with to the sword. As fast as the houses were cleared on both sides, the Romans advanced in order of battle towards the citadel; but with a vigorous resistance from the Carthaginians, who on this occasion behaved with uncommon resolution. From the market-place to the citadel, two bodies of men fought their way every step one above, on the roofs of the houses, the other below in the streets. The slaughter was inexpreffibly great and dreadful. The air rung with shrieks and lamentations. Some were cut in pieces, others threw themselves down from the tops of the houses; so that the streets were filled with dead and mangled bodies. But the destruction was yet greater, when the proconsul commanded fire to be set to that quarter of the town which lay next to the citadel. Incredible multitudes, who had escaped the swords of the enemy, perished in the flames, or by the fall of the houses. After the fire, which lasted six days, had demolished a sufficient number of houses, *Æmilianus* ordered the rubbish to be removed, and a large area to be made, where all his troops might have room to act. Then he appeared with his whole army before *Byrsa*; which so terrified the Carthaginians, who had fled thither for refuge, that first of

172
Which is set on fire.

all 25,000 women, and then 30,000 men, came out of the gates in such a condition as moved pity. They threw themselves prostrate before the Roman general, asking no favour but life. This was readily granted, not only to them, but to all that were in *Byrsa*, except the Roman deserters, whose number amounted to 900. *Aidrubal's* wife earnestly intreated her husband to suffer her to join the suppliant, and carry with her to the proconsul her two sons, who were as yet very young; but the barbarian denied her request, and rejected her remonstrances with menaces. The Roman deserters seeing themselves excluded from mercy, resolved to die sword in hand, rather than deliver themselves up to the vengeance of their countrymen. Then *Aidrubal*, finding them all resolved to defend themselves to the last breath, committed to their care his wife and children; after which he, in a most cowardly and mean-spirited manner, came and privately threw himself at the conqueror's feet. The Carthaginians in the citadel no sooner understood that their commander had abandoned the place, than they threw open the gates, and put the Romans in possession of *Byrsa*. They had now no enemy to contend with but the 900 deserters; who, being reduced to despair, retreated into the temple of *Æsculapius*, which was as a second temple within the first. There the proconsul attacked them; and these unhappy wretches, finding there was no way to escape, set fire to the temple. As the flames spread, they retreated from one part of the building to another, till they got to the roof. There *Aidrubal's* wife appeared in her best apparel, and having uttered the most bitter imprecations against her husband, whom she saw standing below with *Æmilianus*, "Base coward, (said she), the mean things thou hast done to save thy life shall not avail thee; thou shalt die this instant, at least in thy two children." Having thus spoken, she stabbed both the infants with a dagger; and while they were yet struggling for life, threw them both from the top of the temple, and then leaped down after them into the flames.

Æmilianus delivered up the city to be plundered, but in the manner prescribed by the Roman military law. The soldiers were allowed to appropriate to themselves all the furniture, utensils, and brass money, they should find in private houses. But all the gold and silver, the statues, pictures, &c. were reserved to be put into the hands of the quætors. On this occasion the cities of *Sicily*, which had been often plundered by the Carthaginian armies, recovered a number of statues, pictures, and other valuable monuments: among the rest, the famous brazen bull, which *Phalaris* had ordered to be cast, and used as the chief instrument of his cruelty, was restored to the inhabitants of *Agrigentum*. As *Æmilianus* was greatly inclined to spare what remained of this stately metropolis, he wrote to the senate on the subject, from whom he received the following orders: 1. The city of Carthage, with *Byrsa*, and *Megalia*, shall be entirely destroyed, and no traces of them left. 2. All the cities that have lent Carthage any assistance shall be dismantled. 3. The territories of those cities which have declared for the Romans, shall be enlarged with lands.

Carthage.

174
Cruelty and cowardice of *Aidrubal*.175
Aidrubal's wife destroys herself and two children.176
Carthage plundered.

Carthage. lands taken from the enemy. 4. All the lands between Hippò and Carthage shall be divided among the inhabitants of Utica. 5. All the Africans of the Carthaginian state, both men and women, shall pay an annual tribute to the Romans at so much per head. 6. The whole country, which was subject to the Carthaginian state, shall be turned into a Roman province, and be governed by a prætor, in the same manner as Sicily. Lastly, Rome shall send commissioners into Africa, there to settle jointly with the prætorial the state of the new province.—Before Æmilianus destroyed the city, he performed those religious ceremonies which were required on such occasions: he first sacrificed to the gods, and then caused a plough to be drawn round the walls of the city. After this, the towers, ramparts, walls, and all the works which the Carthaginians had raised in the course of many ages, and at a vast expence, were levelled with the ground; and lastly, fire was set to the edifices of this proud metropolis, which consumed them all, not a single house escaping the flames. Though the fire began in all quarters at the same time, and burnt with incredible fury, it continued for 17 days before all the buildings were consumed.

177
And utterly
destroyed.

Thus fell Carthage, about 146 years before the birth of Christ; a city whose destruction ought to be attributed more to the intrigues of an abandoned faction, composed of the most profligate part of its citizens, than to the power of its rival. The treasure Æmilianus carried off, even after the city had been delivered up to be plundered by the soldiers, was immense, Pliny making it to amount to 4,470,000 pounds weight of silver. The Romans ordered Carthage never to be inhabited again, denouncing dreadful imprecations against those, who, contrary to this prohibition, should attempt to rebuild any part of it, especially Byrra and Megalia. Notwithstanding this, however, about 24 years after, C. Græchus, tribune of the people, in order to ingratiate himself with them, undertook to rebuild it; and, to that end, conducted thither a colony of 6000 Roman citizens. The workmen, according to Plutarch, were terrified by many unlucky omens at the time they were tracing the limits and laying the foundations of the new city; which the senate being informed of, would have suspended the attempt. But the tribune, little affected with such presages, continued to carry on the work, and finished it in a few days. From hence it is probable that only a slight kind of huts were erected; but, whether Græchus executed his design, or the work was entirely discontinued, it is certain, that Carthage was the first Roman colony ever sent out of Italy. According to some authors, Carthage was rebuilt by Julius Cæsar; and Strabo, who flourished in the reign of Tiberius, affirms it in his time to have been equal if not superior to any other city in Africa. It was looked upon as the capital of Africa for several centuries after the commencement of the Christian era. Maxentius laid it in ashes about the sixth or seventh year of Constantine's reign. Genferic, king of the Vandals, took it A.D. 439; but about a century afterwards, it was re-annexed to the Roman empire by the renowned Belisarius. At last the Saracens, under Mohammed's successors, towards the

178
Rebuilt.

179
Utterly destroyed by the Saracens.

close of the seventh century, so completely destroyed it, that there are now scarce any traces remaining.

At the commencement of the third Punic war, Carthage appears to have been one of the first cities in the world.—It was seated on a peninsula 360 It's ancient grandeur. 185
Italia or 45 miles in circumference, joined to the continent by an isthmus 23 Italia or three miles and a furlong in breadth. On the west side there projected from it a long tract of land half a stadium broad; which shooting out into the sea, separated it from a lake or morals, was strongly fortified on all sides by rocks, and a single wall. In the middle of the city stood the citadel of Byrra, having on the top of it a temple sacred to Æsculapius, seated upon rocks on a very high hill, to which the ascent was by 60 steps. On the fourth side the city was surrounded by a triple wall, 30 cubits high; flanked all round by parapets and towers, placed at equal distances of 480 feet. Every tower had its foundation sunk 32 feet deep, and was four stories high, though the walls were but two; they were arched; and, in the lower part, corresponding in depth with the foundations above-mentioned, were stalls large enough to hold 300 elephants with their fodder, &c. Over these were stalls and other conveniences for 4000 horses; and there was likewise room for lodging 20,000 foot, and 4000 cavalry, without in the least incommoding the inhabitants. There were two harbours, so disposed as to have a communication with one another. They had one common entrance 70 feet broad, and shut up with chains. The first was appropriated to the merchants; and included in it a vast number of places of refreshment, and all kinds of accommodations for seamen. The second, as well as the island of Cothon, in the midst of it, was lined with large keys, in which were distinct receptacles for securing and sheltering from the weather 220 ships of war. Over these were magazines of all sorts of naval stores. The entrance into each of these receptacles was adorned with two marble pillars of the Ionic order; so that both the harbour and island represented on each side two magnificent galleries. Near this island was a temple of Apollo, in which was a statue of the god all of massy gold; and the inside of the temple all lined with plates of the same metal, weighing 1000 talents. The city was 23 miles in circumference, and at the time we speak of contained 700,000 inhabitants. Of their power we may have some idea, by the quantity of arms they delivered up to the Roman consuls. The whole army was astonished at the long train of carts loaded with them, which were thought sufficient to have armed all Africa. At least it is certain, that on this occasion were put into the hands of the Romans, 2000 catapultæ, 200,000 complete suits of armour, with an innumerable quantity of swords, darts, javelins, arrows, and beams armed with iron which were thrown from the ramparts by the ballistæ.

The character transmitted of the Carthaginians is extremely bad; but we have it only on the authority of the Romans, who being their implacable enemies, cannot be much relied upon. As to their religion, manners, &c. being much the same with the Phœnicians of which they were a colony, the reader is referred for an account of these things to the article PHœNICIA.

New.

New-Carthage
↓
Carthage.

NEW-CARTHAGE, a considerable town of Mexico, in the province of Costarica. It is a very rich trading place. W. Long. 86. 7. N. Lat. 9. 5.

CARTHAGENA, a province of South America, and one of the most considerable in New Castile, on account of the great trade carried on by the capital; for the country itself is neither fertile, rich, nor populous. The capital city, called likewise *Carthage*, is situated in W. Long. 77. N. Lat. 11, on a sandy island, by most writers called a peninsula; which, forming a narrow passage on the south-west, opens a communication with that called *Tierra Bomba*, as far as *Bocca Chica*. The little island which now joins them, was formerly the entrance of the bay; but it having been filled up by orders of the court, *Bocca Chica* became the only entrance: this, however, has been filled up since the attempt of Vernon and Wentworth, and the old passage again opened. On the north side the land is so narrow, that, before the wall was begun, the distance from sea to sea was only 35 toises; but afterwards enlarging, it forms another island on this side; so that, excepting these two places, the whole city is entirely surrounded by salt water. To the eastward it has a communication, by means of a wooden bridge, with a large suburb called *Xemani*, built on another island, which is also joined to the continent by a bridge of the same materials. The fortifications both of the city and suburbs, are built after the modern manner, and lined with free-stone; and, in time of peace, the garrison consists of ten companies of 77 men each, besides militia. The city and inburs are well laid out, the streets straight, broad, uniform, and well paved. All the houses are built of stone or brick, only one story high, well contrived, neat, and furnished, with balconies and lattices of wood, which is more durable in that climate than iron, the latter being soon corroded by the acrimonious quality of the atmosphere. The climate is exceedingly unhealthy. The Europeans are particularly subject to the terrible disease called the *black vomit*, which sweeps off multitudes annually on the arrival of the galleons. It seldom continues above three or four days; in which time the patient is either dead, or out of danger, and if he recovers is never subject to a return of the same distemper.—This disease has hitherto foiled all the art of the Spanish physicians; as has also the leprosy, which is very common here. At *Carthage*, likewise, that painful tumour in the legs, occasioned by the entrance of the *Dracunculus* or Guinea-worm, is very common and troublesome. Another disorder peculiar to this country and to Peru, is occasioned by a little insect called *Nigua*, so extremely minute, as scarce to be visible to the naked eye. This insect breeds in the dust, insinuates itself into the soles of the feet and the legs, piercing the skin with such subtilty, that there is no being aware of it, before it has made its way to the flesh. If it is perceived in the beginning, it is extracted with little pain; but having once lodged its head, and pierced the skin, the patient must undergo the pain of an incision, without which a nodule would be formed, and a multitude of insects ingendered, which would soon overpread the foot and leg. One species of the *nigua* is venomous; and when it enters the toe, an inflammatory swelling,

greatly resembling a venercal bubo, takes place in the groin.

Carthage
↓
Carthamus.

CARTHAGENA, a sea-port town of Spain in the kingdom of Murcia, and capital of a territory of the same name; built by Asdrubal, a Carthaginian general, and named after Carthage. It has the best harbour in all Spain, but nothing else very considerable; the bishop's see being transferred to Toledo. In 1706 it was taken by Sir John Leak; but the Duke of Berwick retook it afterwards. W. Long. o. 58. N. Lat. 37. 36.

CARTHAMUS, *BASTARD-SAFFRON*, or *Safflower*, a genus of the polygamia æqualis order belonging to the syngenesia class of plants. Of this genus there are nine species; but the only remarkable one is the tinctorius, with a saffron-coloured flower. This is a native of Egypt and some of the warm parts of Asia. It is at present cultivated in many parts of Europe, and also in the Levant, from whence great quantities of it are annually imported into Britain for the purposes of dyeing and painting. It is an annual plant; and rises with a stiff ligneous stalk, about two feet and a half or three feet in height, dividing upwards into many branches, garnished with oval pointed leaves sitting close to the branches. The flowers grow single at the extremity of each branch; the heads of the flowers are large, inclosed in a scaly empalement; each scale is broad at the base, flat, and formed like a leaf of the plant, terminating in a sharp spine. The lower part of the empalement spreads open; but the scales above closely embrace the florets, which are of a fine saffron colour, and are the part used for the purposes above-mentioned. The good quality of this commodity is in the colour, which is of a bright saffron hue; and in this the British *carthamus* very often fails; for if there happens much rain during the time the plants are in flower, the flowers change to a dark or dirty yellow, as they likewise do if the flowers are gathered with any moisture remaining upon them.—The plants are propagated by seeds, which should be sown in drills, at two feet and a half distance from one another, in which the seeds should be scattered singly. The plants will appear in less than a month; and in three weeks or a month after, it will be proper to hoe the ground; at which time the plants should be left six inches distant: after this they will require a second hoeing; when they must be thinned to the distance at which they are to remain. If after this they are hoed a third time, they will require no farther care till they come to flower; when, if the safflower is intended for use, the florets should be cut off from the flowers as they come to perfection; but this must be performed when they are perfectly dry; and then they should be dried in a kiln with a moderate fire, in the same manner as the true saffron. But in those flowers which are propagated for seeds, the florets must not be cut off, or the seeds will prove abortive.—The seeds of *carthamus* have been celebrated as a cathartic; but they operate very slowly, and for the most part disorder the stomach and bowels, especially when given in substance: triturated with distilled aromatic waters, they form an emulsion less offensive, yet inferior in efficacy to the more common purgatives. They are eaten

Carthusians
|
Carton.

eaten by a species of Egyptian parrot, which is very fond of them; to other birds or beasts they would prove a mortal poison.

CARTHUSIANS, a religious order founded in the year 1080, by one Brindo. The Carthusians, so called from the desert of *Chartreux*, the place of their institution, are remarkable for the austerity of their rule. They are not to go out of their cells, except to church, without leave of their superior; nor speak to any person without leave. They must not keep any portion of their meat or drink till next day; their beds are of straw, covered with a felt; their clothing two hair-cloaths, two cowls, two pair of hose, and a cloak, all coarse. In the refectory, they are to keep their eyes on the dish, their hands on the table, their attention on the reader, and their hearts fixed on God. Women are not allowed to come into their churches. It is computed that there are 172 houses of Carthusians; whereof five are of *Nuns*, who practise the same austerities as the Monks. They are divided into 16 provinces, each of which has two visitors. There have been several canonized saints of this order, four cardinals, 70 archbishops and bishops, and a great many very learned writers.

CARTHUSIAN-Powder, the fame with kermes-mineral. See *KERMES*.

CARTILAGE, in anatomy, a body approaching to the nature of bones; but lubricous, flexible, and elastic. See *ANATOMY*, n° 3.

CARTILAGINOUS, in ichthyology, a title given to all fish whose muscles are supported by cartilages instead of bones; and comprehends the same genera of fish to which Linnæus has given the name of *amphibia nantes*: but the word *amphibia* ought properly to be confined to such animals as inhabit both elements; and can live, without any inconvenience, for a considerable time, either on land or in water; such as tortoises, frogs, and several species of lizards; and, among the quadrupeds, hippopotami, &c. &c.

Many of the cartilaginous fish are viviparous, being excluded from an egg, which is hatched within them. The egg consists of a white and a yolk; and is lodged in a case formed of a thick tough substance, not unlike softened horn; such are the eggs of the *ray* and *shark* kinds. Some again differ in this respect, and are oviparous; such is the *sturgeon*, and others.

They breathe either through certain apertures beneath, as in the *rays*; on their sides, as in the *sharks*, &c.; or on the top of the head, as in the *pipe-fish*: for they have not covers to their gills like the bony fish.

CARTMEL, a town of Lancashire in England. It is seated among the hills called Carmel-fells, not far from the sea, and near the river Kent; adorned with a very handsome church, built in the form of a cross like a cathedral. The market is well supplied with corn, sheep, and fish. W. Long. 2. 43. N. Lat. 54. 15.

CARTON, or **CARTOON**, in painting, a design drawn on strong paper, to be afterwards calked through, and transferred on the fresh plaster of a wall to be painted in fresco.

CARTON is also used for a design coloured, for working in mosaic, tapestry, &c. The cartons for-

merly at Hampton-court, but now at the queen's palace, are designs of Raphael Urbin, intended for tapestry.

CARTOUCHE, in architecture and sculpture, an ornament representing a scroll of paper. It is usually a flat member, with wavings, to represent some inscription, device, cipher, or ornament of armoury. They are, in architecture, much the same as modillions; only these are set under the cornice in wainscoting, and those under the cornice at the eaves of a house.

CARTOUCHE, in the military art, a case of wood, about three inches thick at the bottom, girt with marlin, holding about four hundred musket-balls, besides six or eight balls of iron, of a pound weight, to be fired out of a hobit, for the defence of a pair, &c.

A cartouche is sometimes made of a globular form, and filled with a ball of a pound weight; and sometimes it is made for the guns, being of a ball of half or quarter a pound weight, according to the nature of the gun, tied in form of a bunch of grapes, on a tomion of wood, and coated over. These were made in the room of partridge-shot.

CARTRIDGE, in the military art, a case of pasteboard or parchment, holding the exact charge of a fire-arm. Those for muskets, carbines, and pistols, hold both the powder and ball for the charge; and those of cannon and mortars are usually in cases of pasteboard or tin, sometimes of wood, half a foot long, adapted to the caliber of the piece.

CARTRIDGE-Box, a case of wood or turned iron, covered with leather, holding a dozen musket-cartridges. It is wore upon a belt, and hangs a little lower than the right pocket-hole.

CARTWRIGHT (William) an eminent divine and poet, born at Northway, near Tewksbury, in Gloucestershire, in September 1611. He finished his education at Oxford; afterwards went into holy orders, and became a most florid preacher in the university. In 1642, he had the place of succentor in the church of Salisbury; and, in 1643, was chosen junior proctor in the university. He was also metaphysical reader there. Wit, judgment, elocution, a graceful person and behaviour, occasioned that encomium of him from dean Fell, "That he was the utmost that man could come to." He was an expert linguist; an excellent orator; and at the same time was esteemed an admirable poet. There are extant of his, four plays, and some poems. He died in 1643, aged 33.

CARVER, a cutter of figures, or other devices, in wood. See *CARVING*.

Carvers answer to what the Romans call *sculptores*, who were different from *calatores* or engravers, as these last wrought in metal.

CARVER is also used for the person who cuts up the meat at table. In the great families at Rome, the carver was an officer of some figure. There were masters to teach the art regularly, by means of figures of animals cut in wood. The Greeks also had their carvers, called *δαρτοι*, *q. d. diribitores*, or distributors. In the primitive times the master of the feast carved for all his guests. Thus, in Homer, when Agamemnon's ambassadors were entertained at Achilles's table, the hero himself carved the meat. Of latter times, the

Cartouche
|
Carver.

Carvi
Caruncula.

the same office, on solemn occasions, was executed by the chief men of Sparta.

CARUI, or CARVI, in botany. See CARUM.

CARVING, in a general sense, the art or act of cutting or fashioning a hard body, by means of some sharp instrument, especially a chisel. In this sense carving includes statuary and engraving, as well as cutting in wood.

CARVING, in a more particular sense, is the art of engraving or cutting figures in wood. In this sense *carving*, according to Pliny, is prior both to statuary and painting.

To carve a figure or design, it must be first drawn or pasted on the wood; which done, the rest of the block, not covered by the lines of the design, are to be cut away with little narrow-pointed knives. The wood fittest for the use is that which is hard, tough, and close, as beech, but especially box: to prepare it for drawing the design on, they wash it over with white-lead tempered in water; which better enables it either to bear ink or the crayon, or even to take the impression by chalking. When the design is to be pasted on the wood, this whitening is omitted, and they content themselves with sealing the wood well planed. Then wiping over the printed side of the figure with gum tragacanth dissolved in water, they clap it smooth on the wood, and let it dry; which done, they wet it slightly over, and fret off the surface of the paper gently, till all the strokes of the figure appear distinctly. This done, they fall to cutting, or carving, as above.

CARUM, CARAWAY; a genus of the digymia order, belonging to the pentandria class of plants.

Species, &c. 1. The caraway of the shops grows naturally in many places of Britain. It is a biennial plant, which rises from seeds one year, flowers the next, and perishes soon after the seeds are ripe. It hath a taper root like a parsnep, but much smaller, which runs deep into the ground, sending out many small fibres, and hath a strong aromatic taste. From the root arises one or two smooth, solid, channelled stalks, about two feet high, garnished with winged leaves, having long naked foot-stalks. 2. The hyspanicum is also a biennial, and is a native of Spain. It rises with a stronger stalk than the former, which seldom grows more than a foot and half high; but is closely garnished with fine narrow leaves like those of dill. Both these plants are propagated by seeds, which ought to be sown in autumn. Sheep, goats, and swine, eat this plant; cows and horses are not fond of it. Parkinson says, the young roots of caraway are better eating than parsneps. The tender leaves may be boiled with pot herbs. The seeds have an aromatic smell, and a warm pungent taste. They are used in cakes, incruised with sugar, as sweet-meats, and distilled with spirituous liquors, for the sake of the flavour they afford. They are in the number of the four greater hot seeds; and frequently employed, as a stomachic and carminative, in flatulent colics and the like. See MATERIA MEDICA, n° 218.

CARUNCULA, or CARUNCLE, in anatomy, a term denoting a little piece of flesh, and applied to several parts of the human body. Thus,

CARUNCULE *Myrtiformes*, in anatomy, fleshy knobs about the size of a myrtle-berry, which owe their origin to the breaking of the hymen. See ANATOMY, n° 372, d.

Carunculae
Cary.

CARUNCLES in the urethra, proceeding from a gonorrhœa, or an ulceration of the urethra, may be reduced by introducing the *BOUGIE*.

CARUS, a sudden deprivation of sense and motion, affecting the whole body. See (the *Index* sub-joined to) MEDICINE.

CARUS (Marcus Aurelius), was raised from a low station, by his great merit, to be emperor of Rome in 282. He shewed himself worthy of the empire; subdued its enemies; and gave the Romans a prospect of happy days, when he was unfortunately killed by lightning in 284.

CARWAR, a town of Asia, on the coast of Malabar in the East Indies, and where the East India company have a factory, fortified with two bastions. The valleys about it abound in corn and pepper, which last is the best in the East Indies. The woods on the mountains abound with quadrupeds, such as tigers, wolves, monkeys, wild hogs, deer, elks, and a sort of beeves of a prodigious size. The religion of the natives is Paganism; and they have a great many strange and superstitious customs. E. Long. 73. 7. N. Lat. 15. 0.

CARYATES, in antiquity, a festival in honour of Diana named *Caryatis*, held at Caryum, a city of Laconia. The chief ceremony was a certain dance said to have been invented by Castor and Pollux, and performed by the virgins of the place. During Xerxes's invasion, the Laconians not daring to appear and celebrate the customary solemnity, to prevent incurring the goddess's anger by such an intermission, the neighbouring swains are said to have assembled and sung pastorals or *buccolini*, which is said to have been the origin of *bucolic* poetry.

CARY (Lucius), Lord viscount Falkland, was born in Oxfordshire, about the year 1610; a young nobleman of great abilities and accomplishments. About the time of his father's death in 1633, he was made gentleman of the privy chamber to king Charles I. and afterward secretary of state. Before the assembling of the long parliament, he had devoted himself to literature, and every pleasure which a fine genius, a generous disposition, and an opulent fortune, could afford: when called into public life, he stood foremost in all attacks on the high prerogatives of the crown; but when civil convulsions came to an extremity, and it was necessary to chuse a side, he tempered his zeal, and defended the limited powers that remained to monarchy. Still anxious however for his country, he seems to have dreaded equally the prosperity of the royal party, or that of the parliament; and, among his intimate friends, often sadly reiterated the word *peace*. This excellent nobleman freely exposed his person for the king in all hazardous enterprises, and was killed in the 34th year of his age at the battle of Newbery. He wrote several things, both poetical and political; and in some of the king's declarations, supposed to be penned by lord Falkland, we find the first regular definition of the English constitution that occurs in any composition published by authority.

CARY

Cary
I
Caryophyl-
lus.

CARY (Robert), a learned English chronologer, born in Devonshire about the year 1615. On the reformation, he was preferred to the archdeaconry of Exeter; but on some pretext was ejected in 1664, and spent the rest of his days at his rectory of Portle-mouth, where he died in 1688. He published *Pala-logia Chronica*, a chronology of ancient times, in three parts, didactical, apodeictical, and canonical; and translated the hymns of the church into Latin verse.

CARYATIDES, or CARAITES. See ARCHITECTURE, n° 61.

CARYL (Joseph), a divine of the last century, bred at Oxford, and some time preacher to the society of Lincoln's inn, an employment he filled with much applause. He became a frequent preacher before the long parliament, a licenser of their books, one of the assembly of divines, and one of the triers for the approbation of ministers; in all which capacities he shewed himself a man of considerable parts and learning, but with great zeal against the king's person and cause. On the reformation of Charles II. he was silenced by the act of uniformity, and lived privately in London, where, beside other works, he distinguished himself by a laborious *Exposition of the Book of Job*; and died in 1672.

CARYOPHYLLEI, in botany, the name of a very numerous family, or order, in Linnæus's fragments of a natural method: containing, besides the class of the same name in Tournefort, many other plants, which from their general appearance seem pretty nearly allied to it. The following are the genera, *viz.* Agrostema, Cucubalus, Dianthus, Drypis, Gypsophila, Lychnis, Saponaria, Silene, Velazia, Afline, Arenaria, Bufonia, Cerastium, Cherleria, Glinus, Holosteum, Loefflingia, Moehringia, Polycarpon, Sagina, Spargula, Stellaria, Minuartia, Mollugo, Ortegia, Pharnaceum, Queria. To this order, some have also annexed, though somewhat improperly, the Polypremum and Scleranthus. All the plants of this order are herbaceous, and mostly annual. Some of the creeping kinds do not rise an inch, and the tallest exceed not seven or eight feet. See BOTANY, sect. vi. 22.

CARYOPHYLLUS, the PINK, in botany. See DI-ANTHUS.

CARYOPHYLLUS, the CLOVE-TREE, a genus of the monogynia order, belonging to the polyandria class of plants. Of this there is but one species, *viz.* the aromaticus, which is a native of the Molucca islands, particularly of Amboyna, where it is principally cultivated. The clove-tree resembles, in its bark, the olive; and is about the height of the laurel, which it also resembles in its leaves. No verdure is ever seen under it. It has a great number of branches, at the extremities of which are produced vast quantities of flowers, that are first white, then green, and at last pretty red and hard. When they arrive at this degree of maturity, they are, properly speaking, *cloves*. As they dry, they assume a dark yellowish cast; and, when gathered, become of a deep brown. The season for gathering the cloves is from October to February. The boughs of the trees are then strongly shaken, or the cloves beat down with long reeds. Large cloths are spread to receive them, and they are

afterwards either dried in the sun, or in the smoke of Caryophyllus the bamboo-cane. The cloves which escape the notice of those who gather them, or are purposely left upon the tree, continue to grow till they are about an inch in thickness; and these falling off, produce new plants, which do not bear in less than eight or nine years. These, which are called *mother-cloves*, are inferior to the common sort; but are preferred in sugar by the Dutch; and, in long voyages, eat after their meals, to promote digestion.

The clove, to be in perfection, must be full sized, heavy, oily, and easily broken; of a fine smell, and of a hot aromatic taste, so as almost to burn the throat. It should make the fingers smart when handled, and leave an oily moisture upon them when pressed. In the East Indies, and in some parts of Europe, it is so much admired as to be thought an indispensable ingredient in almost every dish. It is put into their food, liquors, wines, and enters likewise the composition of their perfumes. Considered as medicines, cloves are very hot, stimulating, aromatics; and possess in an eminent degree the general virtues of substances of this class*. Their pungency resides in their resin; or rather in a combination of resin with essential oil†: for the spirituous extract is very pungent; but if the oil and the resin contained in this extract are separated from each other by distillation, the oil will be very mild; and any pungency which it does retain, proceeds from some small portion of adhering resin, and the remaining resin will be insipid. No plant, or part of any plant, contains such a quantity of oil as cloves do. From 16 ounces Newinan obtained by distillation two ounces and two drams, and Hoffman obtained an ounce and an half of oil from two ounces of the spice. The oil is specifically heavier than water. Cloves acquire weight by imbibing water; and this they will do at some considerable distance. The Dutch, who trade in cloves, make a considerable advantage by knowing this secret. They sell them always by weight; and when a bag of cloves is ordered, they hang it, for several hours before it is sent in, over a vessel of water, at about two feet distance from the surface. This will add many pounds to the weight, which the unwary purchaser pays for on the spot. This is sometimes practised in Europe, as well as in the spice islands: but the degree of moisture must be more carefully watched in the latter; for there a bag of cloves will, in one night's time, attract so much water, that it may be pressed out of them by squeezing them with the hand.

The clove-tree is never cultivated in Europe. At Amboyna the company have allotted the inhabitants 4000 parcels of land, on each of which they were at first allowed, and about the year 1720 compelled, to plant about 125 trees, amounting in all to 500,000. Each of these trees produces annually on an average more than two pounds of cloves; and consequently the collective produce must weigh more than a million. The cultivator is paid with the specie that is constantly returned to the company, and receives some unbleached cottons which are brought from Comorandel.

CASAL, a strong town of Italy in Mounterrat, with a citadel and a bishop's see. It was taken by

lus
I
Casal.

* See *Matéria Medica*, n° 49.

† See *Pour-moy*, n° 320.

Cafal
Cafati.

the French from the Spaniards in 1640; and the duke of Mantua sold it to the French in 1681. In 1695 it was taken by the allies, who demolished the fortifications; but the French retook it, and fortified it again. The king of Sardinia became master of it in 1706, from whom the French took it in 1745; however, the king of Sardinia got possession again in 1746. It is seated on the river Po, in E. Long. 8. 37. N. Lat. 54. 7.

CASAL-Maggiore, a small strong town of Italy, in the duchy of Milan, seated on the river Po. E. Long. 11. 5. N. Lat. 45. 6.

CASA-NOVA (Marc Antony), a Latin poet, born at Rome, succeeded particularly in epigrams. The poems he composed in honour of the illustrious men of Rome are also much esteemed. He died in 1527.

CASAN, a considerable town of Asia, and capital of a kingdom of the same name in the Russian empire, with a strong castle, a citadel, and an archbishop's see. The country about it is very fertile in all sorts of fruits, corn, and pulse. It carries on a great trade in furs, and furnishes wood for the building of ships. The kingdom of Casan is bounded on the north by Permian, on the east by Siberia, on the south by the river Wolga, and on the west by the province of Mowcow. E. Long. 53. 25. N. Lat. 55. 38.

CASAS (Bartholomew de las) bishop of Chiapa, distinguished for his humanity and zeal for the conversion of the Indians, was born at Seville in 1474; and went with his father, who failed to America with Christopher Columbus in 1493. At his return to Spain he embraced the state of an ecclesiastic, and obtained a curacy in the island of Cuba; but some time after quitted his cure in order to procure liberty for the Indians, whom he saw treated by the Spaniards in the most cruel and barbarous manner, which naturally gave them an unconquerable aversion to Christianity. Bartholomew exerted himself with extraordinary zeal, for 50 years together, in his endeavours to persuade the Spaniards that they ought to treat the Indians with equity and mildness; for which he suffered a number of persecutions from his countrymen. At last the court, moved by his continual remonstrances, made laws in favour of the Indians, and gave orders to the governors to observe them, and see them executed*. He died at Madrid in 1566, aged 92. He wrote several works, which breathe nothing but humanity and virtue. The principal of them are, 1. An account of the destruction of the Indians. 2. Several treatises in favour of the Indians, against Dr Sepulveda, who wrote a book to justify the inhuman barbarities committed by the Spaniards. 3. A very curious, and now scarce, work in Latin, on this question, "Whether kings or princes can, consistently with conscience, or in virtue of any right or title, alienate their subjects and place them under the dominion of another sovereign?"

CASATI (Paul), a learned Jesuit, born at Placentia in 1617, entered early among the Jesuits; and, after having taught mathematics and divinity at Rome, was sent into Sweden to queen Christina, whom he prevailed on to embrace the popish religion. He wrote, 1. *Vacuum proscriptum*. 2. *Terra machinis mota*.

3. *Machanicorum, libri octo*. 4. *De Igne Dissertationes*; which is much esteemed. 5. *De Angelis Disputatio Theolog.* 6. *Hydrostatica Dissertationes*. 7. *Opticae Disputationes*. It is remarkable that he wrote this treatise on optics at 88 years of age, and after he was blind. He also wrote several books in Italian.

CASAUON (Ifaac), was born at Geneva in 1559; and Henry IV. appointed him his library keeper in 1603. After this prince's death, he went into England with Sir Henry Wotton, ambassador from King James I. where he was kindly received, and engaged in writing against Baronius's annals: he died not long after this, in 1614; and was interred in Westminster-abbey, where a monument was erected to him. He was greatly skilled in the Greek, and in criticism; published several valuable commentaries; and received the highest eulogiums from all his contemporaries.

CASAUON (Meric), son of the preceding, was born at Geneva in 1599. He was bred at Oxford, and took the degree of master of arts in 1621. The same year he published a book in defence of his father against the calumnies of certain Roman-catholics; which gained him the favour of King James I. and a considerable reputation abroad. He was made prebendary of Canterbury by archbishop Laud. In the beginning of the civil war he lost all his spiritual promotions, but still continued to publish excellent works. Oliver Cromwell, then lieutenant-general of the parliament's forces, would have employed his pen in writing the history of the late war; but he declined it, owning, that his subject would oblige him to make such reflections as would be ungrateful, if not injurious, to his lordship. Notwithstanding this answer, Cromwell, sensible of his worth, ordered three or four hundred pounds to be paid him by a bookseller in London whose name was Cromwell, on demand, without requiring from him any acknowledgement of his benefactor. But this offer he rejected, though his circumstances were then mean. At the same time it was proposed by his friend Mr Greaves, who belonged to the library at St James's, that, if Casaubon would gratify Cromwell in the request above-mentioned, all his father's books which were then in the royal library, having been purchased by King James, should be restored to him, and a pension of 300*l.* a-year paid to the family as long as the youngest son of Dr Casaubon should live; but this also was refused. He likewise refused handsome offers from Christina queen of Sweden, being determined to spend the remainder of his life in England. At the restoration he recovered all his preferments, and continued writing to his death in 1671. He was the author of an English translation of Marcus Aurelius Antoninus's meditations, and of Lucius Florus; editions of several of the classics, with notes; a treatise of use and custom; a treatise of enthusiasm; with many other works; and he left a number of MSS. to the university of Oxford.

CASCADE, a steep fall of water from a higher into a lower place.

They are either natural, as that at Tivoli, &c. or artificial, as those of Versailles, &c. and either falling with gentle descent, as those of Sceaux; or in form of a buffet, as at Trianon; or down steep

Casaubon
Cafcade.

* See the
article
Mexico.

form of a perron, as at St Clou; or from baſon to baſon, &c.

CASCAIS, a town of Eſtremadura in Portugal, ſituated at the mouth of the river Tagus, 17 miles eaſt of Liſbon. W. Long. 10. 15. N. Lat. 38. 40.

CASE, among grammarians, implies the different inflections or terminations of nouns, ſerving to expreſs the different relations they bear to each other, and to the things they repreſent. See **GRAMMAR**, n^o 17.

CASE alſo denotes a receptacle for various articles; as a caſe of knives, of lancets, of piſtols, &c.

CASE, in printing, a large flat oblong frame placed aſlope, divided into ſeveral compartments, or little ſquare cells; in each of which are lodged a number of types, or letters, of the ſame kind, whence the compoſitor takes them out, each as he needs it, to compoſe his matter. See **PRINTING**.

CASE is alſo uſed for a certain numerous quantity of divers things. Thus a caſe of crown-glaſs contains uſually 24 tables, each table being nearly circular, and about three feet fix inches diameter; of New-caſtle glaſs, 35 tables; of Normandy glaſs, 25.

CASE-HARDENING of Iron, is a ſuperficial converſion of that metal into ſteel, by the ordinary method of converſion, namely by cementation with vegetable or animal coals. This operation is generally practiſed upon ſmall pieces of iron wrought into tools and inſtruments to which a ſuperficial converſion is ſufficient; and it may be performed conveniently by putting the pieces of iron to be caſe-hardened, together with the cement, in an iron box, which is to be cloſely ſhut and expoſed to a red heat during ſome hours. By this cementation a certain thickneſs from the ſurface of the iron will be converted into ſteel, and a proper hardneſs may be afterwards given by ſudden extinction of the heated pieces of converted iron in a cold fluid. See **STEEL**.

CASE-SHOT, in the military art, muſket-balls, ſtones, old iron, &c. put into caſes, and ſhot out of great guns.

CASEMENT, or **CASEMATE**, in architecture, a hollow moulding, which ſome architects make one-fixth of a circle, and others one-fourth.

CASEMENT is alſo uſed in building, for a little moveable window, uſually within a larger, being made to open or turn on hinges.

CASERN, in fortification, lodgings built in garriſon-towns, generally near the rampart, or in the waſte places of the town, for lodging ſoldiers of the garriſon. There are uſually two beds in each caſern for fix ſoldiers to lie, who mount the guard alternately; the third part being always on duty.

CASERTA, an epifcopal town of Italy in the kingdom of Naples, and in the Terra-di-Lavoro, with the title of a duchy, ſeated at the foot of a mountain of the ſame name, in E. Long. 15. 5. N. Lat. 41. 5.

CASES (Peter-James), of Paris, the moſt eminent painter of the French ſchool; the churches of Paris and of Verſailles abound with his works. He died in 1754, aged 79.

CASH, in a commercial ſtyle, ſignifies the ſtock of money which a merchant, trader, or banker, has at his diſpoſal in order to trade.

CASH-Book. See **BOOK-KEEPING**. p. 1269.

CASHEL, or **CASHIL**, a town of Ireland in the county of Tipperary, and province of Munſter, with an archbiſhop's ſee. W. Long. 7. 36. N. Lat. 52. 16.

CASHEW-NUT: See **ANACARDIUM**. This nut grows on the end of the fruit of the Anacardium tree, and is quite bare, of the exact figure of a hare's or ſheep's kidney; it is about an inch long, containing within it a large white kernel of a fine taſte, which is roaſted and eaten. The fruit is generally of a yellow colour, as large as an orange; is very ſtringy; and full of rough, aſtringent, but pleaſant juice, which in America is frequently uſed, like that of lemons with us, in making punch. The outer ſhell of the nut is of an aſh colour, and very ſmooth; under this outer rind, is another which covers the kernel; between them is a thick black inflammable oil which is very cauſtic. When the Weſt India young ladies fancy themſelves too much tanned by the ſcorching rays of the ſun, they gently ſcrape off the thin outside of the ſtone, and then rub their faces all over with the ſtone. Their faces immediately ſwell and grow black; and the ſkin being poiſoned by the cauſtic oil above mentioned, will, in the ſpace of five or fix days, come entirely off in large flakes, ſo that they cannot appear in public in leſs than a fortnight; by which time the new ſkin looks as fair as that of a new-born child. The negroes in Brazil cure themſelves effectually of diſorders in the ſtomach, by eating of the yellow fruit of this tree, the juice of which, being acid, cuts the thick tough humours which obſtructed the free circulation of the blood, and thus removes the complaint. This cure, however, is not voluntary; for their maſters, the Portugueſe, deny them any other ſuſtenance; and, letting them looſe to the woods, where the caſhew-nuts grow in great abundance, leave it in their option to periſh by famine, or ſuſtain themſelves with this fruit.

CASIMIR, the name of ſeveral kings of Poland. See (*Hiſtory of*) **POLAND**.

CASIMIR (Matthias Sorbiewſki), a Polifh Jeſuit, born in 1597. He was a moſt excellent poet; and is, ſays M. Baillet, an exception to the general rule of Ariſtotele and the other ancients, which teaches us to expect nothing ingenious and delicate from northern climates. His odes, epodes, and epigrams, have been thought not inferior to thoſe of the fineſt wits of Greece and Rome. Dr Watts has tranſlated one or two of his ſmall pieces, which are added to his Lyric Poems. He died at Warſaw in 1640, aged 43. There have been many editions of his poems, the beſt of which is that of Paris 1759.

CASING of TIMBER-WORK, among builders, is the plaſtering the houſe all over the outſide with mortar, and then ſtriking it while wet by a ruler, with the corner of a trowel, to make it reſemble the joints of free-ſtone. Some direct it to be done upon heart-laths, becauſe the mortar would, in a little time, decay the ſap-laths; and to lay on the mortar in two thickneſſes, viz. a ſecond before the firſt is dry.

CASK, a piece of defensive armour wherewith to cover the head and neck; otherwiſe called the *head-piece and helmet* *. The word is French, *caſque*, from *caſicum* or *caſſicus*, a diminutive of *caſſis* a helmet, *met.* Le Gendre obſerves, that anciently, in France, the

Cask
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Cassandra.

gens d'arms all wore *casks*. The king wore a *cask* gilt; the dukes and counts silvered; gentlemen of extraction polished steel; and the rest plain iron.

The *cask* is frequently seen on ancient medals, where we may observe great varieties in the form and fashion thereof; as the Greek fashion, the Roman fashion, &c. F. Joubert makes it the most ancient of all the coverings of the head, as well as the most universal. Kings, emperors, and even gods themselves are seen therewith. That which covers the head of Rome, has usually two wings like those of Mercury: and that of some kings is furnished with horns like those of Jupiter Ammon; and sometimes barely bulls or rams horns, to express uncommon force.

CASK, in heraldry, the same with helmet. See *HERALDRY*, n° 45.

CASK, a vessel of capacity, for preserving liquors of divers kinds; and sometimes also dry goods, as sugar, almonds, &c.—A *cask* of sugar is a barrel of that commodity, containing from eight to eleven hundred weight.

CASKET, in a general sense, a little coffer, or cabinet. See *CABINET*.

CASKETS, in the sea-language, are small ropes made of finnet, and fastened to gromets, or little rings upon the yards; their use is to make fast the sail to the yard when it is to be furled.

CASPIAN SEA, a large lake of salt water in Asia, bounded by the province of Astracan on the north, and by part of Persia on the south, east, and west. It is upwards of 400 miles long from south to north, and 300 broad from east to west.

CASSANDER, king of Macedon after Alexander the Great, was the son of Antipater. He made several conquests in Greece, abolished democracy at Athens, and gave the government of that state to the orator Demetrius. Olympias, the mother of Alexander, having caused Aridæus and his wife Eurydice, with others of Cassander's party, to be put to death; he besieged Pydne, whither the queen had retired, took it by a stratagem, and caused her to be put to death. He married Thessalonica the sister of Alexander the Great; and killed Roxana and Alexander, the wife and son of that conqueror. At length he entered into an alliance with Seleucus and Lyfimachus, against Antigonus and Demetrius; over whom he obtained a great victory near Ipsus in Phrygia, 301 years before the Christian æra, and died three years after in the 19th year of his reign.

CASSANDRA, in fabulous history, the daughter of Priam and Hecuba, was beloved of Apollo, who promised to bestow on her the spirit of prophecy, provided she would consent to his love. Cassandra seemed to accept the proposal; but had no sooner obtained that gift, than she laughed at the tempter, and broke her word. Apollo, being enraged, revenged himself by causing no credit to be given to her predictions; hence she in vain prophesied the ruin of Troy. Ajax, the son of Oileus, having ravished her in the temple of Minerva, he was struck with thunder. She fell into the hands of Agamemnon, who loved her to distraction; but in vain did she predict that he would be assassinated in his own country. He was killed, with her, by the intrigues of Clytemnestra; but

their death was avenged by Orestes.

CASSANO, a town of Italy in the duchy of Milan, rendered remarkable by an obstinate battle fought there between the Germans and French in 1705. It is subject to the House of Austria, and is seated on the river Adda, in E. Long. 10. 0. N. Lat. 45. 20.

CASSANO, a town of Italy in Calabria citerior, in the kingdom of Naples, with a bishop's see. E. Long. 16. 30. N. Lat. 39. 55.

CASSAVI, or *CASSADA*. See *JATROPHA*.

CASSEL, a town of French Flanders, and capital of a chatellany of the same name: It is seated on a mountain, where the terrace of the castle is still to be seen; and from whence there is one of the finest prospects in the world; for one may see no less than 32 towns, with a great extent of the sea, from whence it is distant 15 miles. E. Long. 2. 27. N. Lat. 50. 48.

CASSEL, the capital city of the landgraviate of Hesse-cassel, in the circle of the Upper Rhine in Germany, is divided into the Old, New, and High Towns. The New Town is best built, the houses being of stone, and the streets broad. The houses of the Old Town, which is within the walls, are mostly of timber; but the streets are broad, and the market-places spacious. The place is strongly fortified, but the fortifications are not regular. The inhabitants are mostly French protestants, and carry on a woollen manufactory. It is seated on the declivity of a hill near the river Fulva, in E. Long. 9. 20. N. Lat. 51. 20.

CASSIA, *WILD SENNA*; a genus of the monogynia order, belonging to the decandria class of plants. There are 30 species, all of them natives of warm climates. The most remarkable is the fistula, or purging cassia of Alexandria. It is a native of Egypt and both Indies, where it rises to the height of 40 or 50 feet, with a large trunk, dividing into many branches, garnished with winged leaves, composed of five pair of spear-shaped lobes, which are smooth, having many transverse nerves from the midrib to the border. The flowers are produced in long spikes at the end of the branches, each standing upon a pretty long foot-stalk; these are composed, like the former, of five yellow concave petals, which are succeeded by cylindrical pods from one to two feet long, with a dark brown woody shell, having a longitudinal seam on one side, divided into many cells by transverse partitions, each containing one or two oval, smooth, compressed seeds, lodged in a blackish pulp, which is used in medicine. Among the species of cassia, Linnaeus mentions the common *SENNA* of the shops; which see. With regard to the culture of all the species, they are propagated by seeds which must be sown upon a hot-bed, and the plants treated in the same manner with other tender exotics. The fistula must have very little water in winter; for the plants grow naturally in dry sandy ground, and moisture is a great enemy to them.

The pulp of the cassia fistula is a gentle laxative, and frequently given in costive habits, in the dose of some drams. Geoffroy says it does excellent service in the painful tension of the belly which sometimes follows the imprudent use of antimonials; and that it may be advantageously acuated by the more acrid purgatives,

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Cassia.

Cassia
Cassimire.

purgatives, or antimonial emetics, or employed to abate their force. Vallinier relates, that the purgative virtue of this medicine is remarkably promoted by manna; that a mixture of four drams of cassia, and two of manna, purges as much as 12 drams of cassia alone, or 32 of manna alone. Sennertus observes, that the urine is apt to be turned of a green colour, by the use of cassia; and sometimes, where a large quantity has been taken, blackish. See MATERIA MEDICA, n° 223.

CASSIA-LIGNEA. See CINNAMOMUM.

CASSIDA, in botany. See SCUTELLARIA.

CASSIDA, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are like threads, but thicker on the outside; the clytra are marginated; and the head is hid under the thorax. There are 31 species of this insect, distinguished principally by differences in their colour.

CASSIMIRE, or CASHMIRE, a province of the Mogul's dominions, in Asia, supposed to have been formerly a lake. It is seated at the extremity of Indostan, to the north of Lahor; and is surrounded by the mountains of Caucasus, between Great Thibet, Little Thibet, Bukharia, Cabellstan, and Lahor. The mountains that are nearest the plain are of a moderate height; are covered with trees or pasture land; and are full of cattle of several sorts, as cows, sheep, goats, and horses, as well as the milk-goat. There are likewise various kinds of game, as partridges, hares, gazels, &c. Beyond these mountains there are others, which rise very high, and have their tops always covered with snow. From these mountains there rises a great number of springs and rivulets, which the inhabitants conduct to their rice-fields. All these streams unite into one large enough to carry boats, which, after several turnings and windings, runs through the middle of the capital city. This province, or kingdom, is about 90 miles in length, and 30 in breadth; and is full of towns and villages. These are intermixed with canals, small lakes, and rivulets. There are here all sorts of European trees and plants, such as apple, pear, plum, apricot, &c.

The capital city, which has the same name as the kingdom, is about two miles in length, and one and a half in breadth. It is seated in a flat country, six miles from the mountains; and on the banks of a lake of fresh water, which is about twelve miles in compass. The river has two wooden bridges built over it, to maintain a communication between both parts of the city. The houses are generally of wood, and well built; and there is a great number of idol temples, which were are all of free-stone, but now in ruins. The houses near the river have their gardens next the water, which make a very fine appearance, especially in summer.

The lake is full of islands, on which they have made pleasure gardens, and planted fruit-trees. These are generally surrounded with tall palms. The inhabitants are very ingenious and industrious, making palankins, and all sorts of cabinets and boxes, in a very curious manner, which are dispersed all over the Indies. They also make a vast number of shauls, which are pieces of stuff about an ell and a half long,

and one broad, curiously embroidered. They are extremely fine and soft, and sell at a great price. The Indians, both men and women, wear them over their heads in the winter. The people have a clear complexion, and are well made. The women are very handsome; though only the common sort are generally seen abroad or in the shops.

It has been by some suspected, that the ten tribes of Israel were carried away captive to this country; but this does not seem probable; for there are no traces of Judaism remaining, all the inhabitants being either Gentoos or Mahometans. E. Long. 75. 25. N. Lat. 34. 30.

CASSINE, the CASSIOBERRY-BUSH or *South-sea Tea*; a genus of the trigynia order, belonging to the pentandria class of plants. There are three species, all of them natives of warm climates. Of these the most remarkable is the *yapon*, which is a native of the maritime parts of Virginia and Carolina. It rises to the height of ten or twelve feet, sending out branches from the ground upward, garnished with spear-shaped leaves placed alternately, which continues green through the year. The flowers are produced in close whorls round the branches, at the footstalks of the leaves; they are white, and divided into five parts, almost to the bottom. The berries are of a beautiful red colour, and as they continue most part of the winter upon the plants without being touched by the birds, we may reasonably conclude that they are possessed of a poisonous quality; as few of the wholesome innocent fruits escape their depredations. The Indians, however, have a great veneration for this plant, and at certain seasons of the year come in great numbers to fetch away the leaves. On such occasions their usual custom, says Miller, is to make a fire upon the ground, and, putting on it a great kettle full of water, they throw in a large quantity of yapon leaves; and when the water has boiled sufficiently, they drink large draughts of the decoction out of the kettle; which seldom fails to vomit them very severely. In this manner, however, they continue drinking and vomiting for three days together, until they imagine themselves sufficiently cleaned; they then gather every one a bundle of the shrub, and carry it home with them.—In the operation of these leaves by vomiting, those who have tasted of them say, that there is no uneasy sensation or pain. The matter discharged comes away in a full stream by the mouth, without any violence, or so much as disposing the patient to reach, or decline his head. The Spaniards who live near the gold mines of Peru, are frequently obliged to drink an infusion of this herb in order to moisten their breasts; without which they are liable to a sort of suffocation, from the strong metallic exhalations that are continually proceeding from the mines. In Paraguay, the Jesuits make a great revenue by importing the leaves of this plant into many countries under the name of Paraguay or South-sea tea, which is there drank in the same manner as that of China or Japan is with us. It is with difficulty preserved in England.

CASSINI (Johannes Dominicus), a most excellent astronomer, born at Piedmont in 1635. His early proficiency in astronomy procured him an invitation

Cassimire
Cassini.

Cassini
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Cassius.

to be mathematical professor at Bologna when he was no more than 15 years of age; and a comet appearing in 1652, he discovered that comets were not accidental meteors, but of the same nature, and probably governed by the same laws, as the planets. In the same year he solved a problem given up by Kepler and Bullialdus as insolvable, which was, to determine geometrically the apogee and eccentricity of a planet from its true and mean place. In 1663, he was appointed inspector-general of the fortifications of the castle of Urbino, and had afterward the care of all the rivers in the ecclesiastical state: he still however prosecuted his astronomical studies, by discovering the revolution of Mars round his own axis; and, in 1666, published his theory of Jupiter's satellites. Cassini was invited into France by Lewis XIV. in 1669, where he settled as the first professor in the royal observatory. In 1677 he demonstrated the line of Jupiter's diurnal rotation; and in 1684 discovered four more satellites belonging to Saturn, Huygens having found one before. He inhabited the royal observatory at Paris more than forty years; and when he died in 1712, was succeeded by his only son James Cassini.

CASSIODORUS (Marcus Aurelius), secretary of state to Theodoric king of the Goths, was born at Squillace, in the kingdom of Naples, about the year 470. He was consul in 514, and was in great credit under the reigns of Athalaric and Vitiges; but at seventy years of age retired into a monastery in Calabria, where he amused himself in making sundials, water hour-glasses, and perpetual lamps. He also formed a library; and composed several works, the best edition of which is that of father Garet, printed at Rouen in 1679. Those most esteemed are his Divine Institutions, and his treatise on the Soul. He died about the year 562.

CASSIOPEIA, in fabulous history, wife to Cepheus king of Ethiopia, and mother of Andromeda. She thought herself more beautiful than the Nereides, who desired Neptune to revenge the affront; so that he sent a sea-monster into the country, which did much harm. To appease the god, her daughter Andromeda was exposed to the monster, but was rescued by Perseus; who obtained of Jupiter, that Cassiopeia might be placed after his death among the stars: hence the constellation of that name, in the northern hemisphere, situated opposite to the Great Bear, on the other side of the pole.

CASSITERIA, in the history of fossils, a genus of crystals, the figures of which are influenced by an admixture of some particles of tin.

The cassiteria are of two kinds; the whitish pellucid cassiterion, and the brown cassiterion. The first is a tolerably bright and pellucid crystal, and seldom subject to the common blemishes of crystal: it is of a perfect and regular form, in the figure of a quadrilateral pyramid; and is found in Devonshire and Cornwall principally. The brown cassiterion is like the former in figure: it is of a very smooth and glossy surface, and is also found in great plenty in Devonshire and Cornwall.

CASSIUS (Spurius), a renowned Roman general and consul, whose enemies accusing him of aspiring to royalty, he was thrown down from the Tarpeian rock,

485 years before Christ; after having thrice enjoyed the consular dignity, been once general of the horse under the first dictator that was created at Rome, and twice received the honour of a triumph.

CASSIUS (Longinus), a celebrated Roman lawyer, flourished 113 years before Christ. He was so inflexible a judge, that his tribunal was called the *Rock of the Impeached*. It is from the judicial severity of this Cassius, that very severe judges have been called *Cassians*.

CASSIUS (Cains), one of the murderers of Julius Cæsar: after his defeat by Mark Anthony at the battle of Philippi, he ordered one of his freed-men to put him to death with his own sword, 41 years before Christ.

CASSOCK, or CASSULA, a kind of robe or gown, wore over the rest of the habit, particularly by the clergy. The word cassock comes from the French *casaque*, an horseman's coat.

CASSOWARY, in ornithology. See STRUTHIO.

CASSUMBAZAR, a town of India, in Asia, situated on the river Ganges, in the province of Bengal: E. Long. 37. and N. Lat. 24.

CASSUMUAR, in the *Materia Medica*, a root approaching to that of zedoary.

It is cardiac and sudorific, and famous in nervous cases: it is also an ingredient in many compositions, and is prescribed in powders, holfuses, and infusions. Its dose is from five to fifteen grains.

CAST is peculiarly used to denote a figure or small statue of bronze. See BRONZE.

CAST, among founders, is applied to tubes of wax fitted in divers parts of a mould of the same matter, by means of which, when the wax of the mould is removed, the melted metal is conveyed into all the parts which the wax before possessed.

CAST also denotes a cylindrical piece of brass or copper, slit in two, lengthwise, used by the founders in sand, to form a canal or conduit in their moulds, whereby the metal may be conveyed to the different pieces intended to be cast.

CAST, among plumbers, denotes a little brazen funnel at one end of a mould, for casting pipes without soldering, by means of which the melted metal is poured into the mould.

CAST, or CASTE, in speaking of the eastern affairs, denotes a tribe, or number of families, of the same rank and profession. The division of a nation into casts chiefly obtains in the dominions of the Great Mogul, kingdom of Bengal, island of Ceylon, and the great peninsula opposite thereto. In each of these there are, according to father Martin, four principal casts, *viz.* the cast of the *bramins*, which is the first and most noble; the cast of the *rajās*, or princes, who pretend to be descended from divers royal families; the cast of the *choutres*, which comprehends all the artificers; and that of the *pariat*, the lowest and most contemptible of all: though Henry Lord, it must be observed, divides the Indians about Surat in four casts, somewhat differently from Martin, *viz.* into *bramins*, or priests; *cuttery*, or soldiers; *shudlers*, which we call banians, or merchants; and *wys*, the mechanics or artificers. Every art and trade is confined to its proper *cast*, nor is allowed to be exercised by

Cassius
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Cast.

Castalio
Castell.

by any but those whole fathers professed the same. So that a taylor's son can never rise to be a painter, nor a painter's son fall to be a taylor; though there are some employments that are proper to all the casts, *e. g.* every body may be a soldier, or a merchant. There are also divers casts which are allowed to till the ground, but not all. The cast of *parias* is held infamous, inasmuch that it is a disgrace to have any dealings or conversation with them; and there are some trades in the cast of *choutres*, which debase their professors almost to the same rank. Thus shoemakers, and all artificers in leather, as also fishermen, and even shepherds, are reputed no better than *parias*.

CASTALIO (Sebastian), was born at Chetillon, on the Rhone, in the year 1515. Calvin conceived such an esteem and friendship for him, during the stay he made at Strasburg in 1540 and 1541, that he lodged him some days at his house, and procured him a regent's place in the college of Geneva. Castalio, after continuing in this office near three years, was forced to quit it in the year 1544, on account of some particular opinions which he held concerning Solomon's song, and Christ's descent into hell. He retired to Basil, where he was made Greek professor, and died in that place in 1564, aged 48. He incurred the high displeasure of Calvin and Theodore Beza, for differing with them concerning predestination and the punishment of heretics. His works are very considerable, both on account of their quality and number. In 1545, he printed at Basil four books of dialogues, containing the principal histories of the bible in elegant Latin; so that youth might thereby make a proficiency in piety and in the Latin tongue at the same time. But his principal work is a Latin and French translation of the scriptures. He began the Latin translation at Geneva in 1542, and finished it at Basil in 1550. It was printed at Basil in 1551, and dedicated by the author to Edward VI. king of England. The French version was dedicated to Henry II. of France, and printed at Basil in 1555. The fault which has been most generally condemned in his Latin translation, is the affectation of using only classical terms.

CASTANEA, in botany. See FAGUS.

CATANOVITZ, a town of Croatia, situated on the river Unna, which divides Christendom from Turkey. E. Long. 17. 20. N. Lat. 45. 40. It is subject to the house of Austria.

CASTEL (Lewis Bertrand), a learned Jesuit, was born at Montpellier in 1688, and entered among the Jesuits in 1703. He studied polite literature in his youth; and at length applied himself entirely to the study of mathematics and natural philosophy. He distinguished himself by writing on gravity; the mathematics; and on the music of colours, a very whimsical idea, which he took great pains to reduce to practice. His piece on gravity, entitled *Traité de la Pensateur universelle*, was printed at Paris, in 1724. He afterwards published his *Mathématique universelle*; which occasioned his being unanimously chosen a fellow of the Royal Society of London, without the least solicitation. He was also a member of the academies of Bourdeaux and Ronen: but his *Clavecin*

oculaire made the most noise; and he spent much time and expence in making an harpsichord for the eye, but without success. He also wrote for and against Sir Isaac Newton, and published several other works; the principal of which are, *Le Plan du Mathématique abrégé*, and a treatise entitled *Optique des Couleurs*. He led a very exemplary life, and died in 1757.

CASTELAMARA, a town of Italy, in the kingdom of Naples, and in the hither Principato, with a bishop's see, and a good harbour. E. Long. 14. 25. N. Lat. 41. 40.

CASTEL-ARAGONESA, a strong town of Italy, in the island of Sardinia, with a bishop's see, and a good harbour. It is seated on the N. W. coast of the island, in E. Long. 8. 57. N. Lat. 40. 56.

CASTEL-BRANCO, a town of Portugal, and capital of the province of Beira; seated on the river Lyra, 35 miles N. W. of Alcantara. W. Long. 8. 0. N. Lat. 39. 35.

CASTEL-FRANCO, a very small, but well fortified frontier town of the Bolognese, in Italy, belonging to the Pope.

CASTEL-DE-VIDE, a small strong town of Alentejo. It was taken by Philip V. W. Long. 6. 25. N. Lat. 39. 15.

CASTEL-FOLIT, a town of Spain, in Catalonia, seated on an inaccessible eminence, between Gironne and Campredon, about 15 miles from each, and near the river Fulva.

CASTEL-GANDOLFO, a town of Italy, in the territory of the church, with a castle, to which the Pope retires in the summer season; 10 miles S. by E. of Rome. E. Long. 12. 46. N. Lat. 41. 44.

CASTEL-NOVO, a strong town of Dalmatia, subject to the Venetians; seated on the gulph of Cataio, in E. Long. 18. 45. N. Lat. 42. 25.

CASTEL-RODRIGO, a town of Portugal, in the province of Tra-os-Montes, in W. Long. 7. 1. N. Lat. 41. 0.

CASTEL-NOVO-DE-CARFAGNANA, a town of Italy, in the Modenese, with a strong fortress. It is the capital of the valley of Carfagnana; and seated on the river Serchio, 17 miles above Lucca.

CASTEL DEL OVO, a small island in the Tuscan Sea, in the gulph of Naples, near a town of that name, to which it is joined by a stone bridge. The fortress is called Castel del Ovo, in which there is always a good garrison.

CASTELBAR, a town of Ireland, in the county of Mayo, and province of Connaught, 35 miles N. of Galway. W. Long. 9. 25. N. Lat. 53. 45.

CASTELL (Edmund) D. D. a learned English divine of the 17th century, distinguished by his skill in the eastern languages. He was educated at Cambridge; where he was master of Catherine hall, and Arabic professor; and was at length canon of Canterbury. He had the greatest share in the Polyglott bible of London; and wrote the *Heptaglotton pro septem Orientalibus*, &c. On this excellent work, which occupied a great part of his life, he bestowed incredible pains and expence, even to the breaking of his constitution, and exhausting of his fortune, having expended no less than 12,000 *l.* upon that work. At length, when it was printed, the copies remained 10-fold

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fold upon his hands. He died in 1685; and lies buried in the church-yard of Higham Gobyon in Bedfordshire, of which he was rector. It appears from the inscription on his monument, which he erected in his lifetime, that he was chaplain to Charles II. He bequeathed all his oriental manuscripts to the university of Cambridge, on condition that his name should be written on every copy in the collection.

CASTELLA, a town of the Mantuan, in Italy, about five miles north-east of the city of Mantua. E. Long. 11. 15. N. Lat. 45. 30.

CASTELLAN, the name of a dignity or charge in Poland: The castellans are senators of the kingdom, but senators only of the lower class, who, in diets, sit on low seats, behind the palatines, or great senators. They are a kind of lieutenants of provinces, and command a part of the palatinate under the palatine.

CASTELLANY, the territory belonging to any city or town, chiefly used in France and Flanders: Thus we say, the castellany of Lisle, Ypres, &c.

CASTELLI (Bernard), an Italian painter, was born at Genoa in 1557; and excelled in colouring and in portraits. He was the intimate friend of Tasso, and took upon himself the task of designing and etching the figures of his Jerusalem Delivered. He died at Genoa in 1629.

Valerio Castelli, one of his sons, was born at Genoa in 1625, and surpassed his father. He particularly excelled in painting battles; and died in 1659.

CASTELVETRO (Lewis), a native of Modena, of the 16th century, famous for his *Comment on Aristotle's Poetics*. He was prosecuted by the inquisition for a certain book of Melancthon, which he had translated into Italian. He retired to Basil, where he died.

CASTIGATION, among the Romans, the punishment of an offender by blows, or beating, with a wand or switch. Castigation was chiefly a military punishment; the power of inflicting which on the soldiery was given to the tribunes. Some make it of two kinds; one with a stick or cane, called *fustigatio*; the other with rods, called *flagellatio*: the latter was the most dishonourable.

CASTIGLIONI (Balthazar), an eminent Italian nobleman, descended from an illustrious and ancient family, and born at his own villa at Cafalico in the duchy of Milan in 1478. He studied painting, sculpture, and architecture, as appears from a book he wrote in favour of these arts; and excelled so much in them, that Raphael Urbino, and Buonarroti, though incomparable artists, never thought their works complete without the approbation of Count Castiglioni. When he was 26 years of age, Guido Ubaldo, Duke of Urbino, sent him ambassador to Pope Julius II. He was sent upon a second embassy to Lewis XII. of France, and upon a third to Henry VII. of England. After he had dispatched his business here, he returned, and began his celebrated work intitled the *Courtier*; which he completed in Rome in 1516. This work is full of moral and political instruction; and if we seek for the Italian tongue in perfection, it is said to be nowhere better found than in this performance. A version of this work, together with the original I-

talian, was published at London in 1727, by A. P. Castiglioni, a gentleman of the same family, who resided there under the patronage of Dr Gibson bishop of London. Count Castiglioni was sent by Clement VII. to the court of the Emperor Charles V. in quality of legate; and died at Toledo in 1529.

CASTIGATORY for SCOLDS. A woman indicted for being a common scold, if convicted, shall be placed in a certain engine of correction, called the *trebucket*, *castigatory*, or *cucking-stool*; which, in the Saxon language, signifies the *scolding-stool*; though now it is frequently corrupted into the *ducking-stool*; because the residue of the judgment is, that, when she is placed therein, she shall be plunged in water for her punishment.

CASTIGLIONE, a small, but strong town of Italy, in Mantua, with a castle. It was taken by the Germans in 1701, and the French defeated the Imperialists near it in 1706. E. Long. 10. 29. N. Lat. 43. 23.

CASTILE, NEW. See TOLEDO.

CASTILLAN, or CASTILLANE, a gold-coin, current in Spain, and worth fourteen rials and sixteen deniers.

CASTILLAN is also a weight used in Spain for weighing gold. It is the hundredth part of a pound Spanish weight. What they commonly call a weight of gold in Spain, is always underitood of the castilian.

CASTILLARÁ, a town of the Mantuan in Italy, situated six miles north-east of the city of Mantua: E. Long. 11. 25. N. Lat. 45. 20.

CASTILLON, a town of Perigort, in the province of Guienne in France, situated on the river Dordogne, sixteen miles east of Bourdeaux: W. Long. 2. 40. N. Lat. 44. 50.

CASTING, in foundery, the running a metal into a mould, prepared for that purpose.

CASTING of Metals, of Letters, Balls, &c. See the article FOUNDERY.

CASTING in Sand or Earth is the running of metals between two frames, or molds, filled with sand or earth, wherein the figure that the metal is to take has been impressed *en creux*, by means of the pattern.

CASTING, among sculptors, implies the taking of casts and impressions of figures, busts, medals, leaves, &c.

The method of taking of casts of figures and busts is most generally by the use of plaster of Paris, i. e. alabaster calcined by a gentle heat. The advantage of using this substance preferably to others, is, that notwithstanding a slight calcination reduces it to a pulverine state, it becomes again a tenacious and cohering body, by being moistened with water, and afterwards suffered to dry; by which means either a concave or a convex figure may be given by a proper mold or model to it when wet, and retained by the hardness it acquires when dry: and from these qualities, it is fitted for the double purpose of making both casts, and molds for forming those casts. The particular manner of making casts depends on the form of the subject to be taken. Where there are no projecting parts, it is very simple and easy; as likewise where there are such as form only a right or any greater angle with the principal surface of the body: but where

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where parts project in lesser angles, or form a curve inclined towards the principal surface of the body, the work is more difficult.

The first step to be taken is the forming the mold. In order to this, if the original or model be a bals relief, or any other piece of a flat form, having its surface first well greased, it must be placed on a proper table, and surrounded by a frame, the sides of which must be at such a distance from it as will allow a proper thickness for the sides of the mold. As much plaster as will be sufficient to cover and rise to such a thickness as may give sufficient strength to the mold, as also to fill the hollow betwixt the frame and the model, must be moistened with water, till it be just of such consistence as will allow it to be poured upon the model. This must be done as soon as possible; or the plaster would concrete or set, so as to become more troublesome in the working, or unfit to be used. The whole must then be suffered to remain in this condition, till the plaster has attained its hardness; and then the frame being taken away, the preparatory cast or mold thus formed may be taken off from the subject entire.

Where the model or original subject is of a round or erect form, a different method must be pursued; and the mold must be divided into several pieces: or if the subject consists of detached and projecting parts, it is frequently most expedient to cast such parts separately, and afterwards join them together.

Where the original subject or mold forms a round, or spheroid, or any part of such round or spheroid, more than one half the plaster must be used without any frame to keep it round the model; and must be tempered with water to such a consistence, that it may be wrought with the hand like very soft paste: but though it must not be so fluid as when prepared for flat figured models, it must yet be as moist as is compatible with its cohering sufficiently to hold together: and being thus prepared, it must be put upon the model, and compressed with the hand, or any flat instrument, that the parts of it may adapt themselves, in the most perfect manner, to those of the subject, as well as be compact with respect to themselves. When the model is so covered to a convenient thickness, the whole must be left at rest till the plaster be set and firm, so as to bear dividing without falling to pieces, or being liable to be put out of its form by slight violence; and it must then be divided into pieces, in order to its being taken off from the model, by cutting it with a knife with a very thin blade; and being divided, must be cautiously taken off, and kept till dry: but it must be always carefully observed, before the separation of the parts be made, to notch them cross the joints, or lines of the division, at proper distances, that they may with ease and certainty be properly conjoined again; which would be much more precarious and troublesome without such directive marks. The art of properly dividing the molds, in order to make them separate from the model, requires more dexterity and skill than any other thing in the art of casting; and does not admit of rules for the most advantageous conduct of it in every case. Where the subject is of a round or spheroidal form, it is best to divide the mold into three parts, which will

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then easily come off from the model: and the same will hold good of a cylinder or any regular curve figure.

The mold being thus formed, and dry, and the parts put together, it must be first greased, and placed in such a position that the hollow may lie upwards, and then filled with plaster mixed with water, in the same proportion and manner as was directed for the casting the mold: and when the cast is perfectly set and dry, it must be taken out of the mold and repaired, where it is necessary; which finishes the whole operation.

This is all that is required with respect to subjects where the surfaces have the regularity above-mentioned: but where they form curves which intersect each other, the conduct of the operation must be varied with respect to the manner of taking the cast of the mold from off the subject or model; and where there are long projecting parts, such as legs or arms, they should be wrought in separate casts. The operator may easily judge from the original subjects, what parts will come off together, and what require to be separated: the principle of the whole consists only in this, that where under-workings, as they are called, occur; that is, wherever a straight line drawn from the basis or insertion of any projection, would be cut or crossed by any part of such projection, such part cannot be taken off without a division; which must be made either in the place where the projection would cross the straight line; or, as that is frequently difficult, the whole projection must be separated from the main body, and divided also lengthwise into two parts: and where there are no projections from the principal surfaces, but the body is so formed as to render the surface a composition of such curves, that a straight line being drawn parallel to the surface of one part would be cut by the out-line, in one or more places, of another part, a division of the whole should be made, so as to reduce the parts of it into regular curves, which must then be treated as such.

In larger masses, where there would otherwise be a great thickness of the plaster, a corps or body may be put within the mold, in order to produce a hollow in the cast; which both saves the expence of the plaster, and renders the cast lighter.

This corps may be of wood, where the forming a hollow of a straight figure, or a conical one with the basis outward, will answer the end: but if the cavity require to be round, or of any curve figure, the corps cannot be then drawn while entire; and consequently should be of such matter as may be taken out piecemeal. In this case, the corps is best formed of clay; which must be worked upon wires to give it tenacity, and suspended in the hollow of the mold, by cross wires lying over the mouth: and when the plaster is sufficiently set to bear handling, the clay must be picked out by a proper instrument.

Where it is desired to render the plaster harder, the water with which it is tempered should be mixed with parchment size properly prepared, which will make it very firm and tenacious.

In the same manner, figures, busts, &c. may be cast of lead, or any other metal, in the molds of pla-

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fter : only the expence of plaster, and the tediousness of its becoming sufficiently dry, when in a very large mass, to bear the heat of melted metal, render the use of clay, compounded with some other proper materials, preferable where large subjects are in question. The clay, in this case, should be washed over till it be perfectly free from gravel or stones; and then mixed with a third or more of fine sand to prevent its cracking; or, instead of sand, coal-ashes sifted fine may be used. Whether plaster or clay be employed for the casting in metal, it is extremely necessary to have the mold perfectly dry; otherwise the moisture, being rarified, will make an explosion that will blow the metal out of the mold, and endanger the operator, or at least crack the mold in such a manner as to frustrate the operation. Where the parts of a mold are larger, or project much, and consequently require a greater tenacity of the matter they are formed of to keep them together, flocks of cloth, prepared like those designed for paper-hangings, or fine cotton plucked or cut till it is very short, should be mixed with the ashes or sand before they are added to the clay to make the composition for the mold. The proportion should be according to the degree of cohesion required: but a small quantity will answer the end, if the other ingredients of the composition be good, and the parts of the mold properly linked together by means of the wires above directed.

There is a method of taking casts in metals from small animals, and the parts of vegetables, which may be practised for some purposes with advantage; particularly for the decorating grottoes or rock-work, where nature is imitated. The proper kinds of animals are lizards, snakes, frogs, birds, or insects; the casts of which, if properly coloured, will be exact representations of the originals.

This is to be performed by the following method. A coffin or proper chest for forming the mold being prepared of clay, or four pieces of boards fixed together, the animal or parts of vegetables must be suspended in it by a string; and the leaves, tendrils, or other detached parts of the vegetables, or the legs, wings, &c. of the animals, properly separated and adjusted in their right position by a small pair of pincers: a due quantity of plaster of Paris and calcined tale, in equal quantities, with some alumen plumosum, must then be tempered with water to the proper consistence for casting; and the subject from whence the cast is to be taken, as also the sides of the coffin, moistened with spirit of wine. The coffin or chest must then be filled with the tempered composition of the plaster and tale, putting at the same time a piece of straight stick or wood to the principal part of the body of the subject, and pieces of thick wire to the extremities of the other parts, in order that they may form, when drawn out after the matter of the mold is properly set and firm, a channel for pouring in the melted metal, and vents for the air; which otherwise, by the rarefaction it would undergo from the heat of the metal, would blow it out or burst the mold. In a short time the plaster and tale will set and become hard, when the stick and wires may be drawn out, and the frame or coffin in which the mold was cast taken away: and the mold must then be put first into a mode-

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rate heat, and afterwards, when it is as dry as can be rendered by that degree, removed into a greater; which may be gradually increased till the whole be red-hot. The animal, or part of any vegetable, which was included in the mold, will then be burnt to a coal; and may be totally calcined to ashes, by blowing for some time gently into the channel and passages made for pouring in the metal, and giving vent to the air, which will, at the same time that it destroys the remainder of the animal or vegetable matter, blow out the ashes. The mold must then be suffered to cool gently; and will be perfect; the destruction of the substance of the animal or vegetable having produced a hollow of a figure correspondent to it: but it may be nevertheless proper to shake the mold, and turn it upside down, as also to blow with the bellows into each of the air-vents, in order to free it wholly from any remainder of the ashes; or, where there may be an opportunity of filling the hollow with quicksilver without expence, it will be found a very effectual method of clearing the cavity, as all dust, ashes, or small detached bodies will necessarily rise to the surface of the quicksilver, and be poured out with it. The mold being thus prepared, it must be heated very hot when used, if the cast be made with copper or brass: but a less degree will serve for lead or tin: and the matter being poured in, the mold must be gently struck: and then suffered to rest till it be cold: at which time it must be carefully taken from the cast, but without the least force; for such parts of the matter as appear to adhere more strongly, must be softened by soaking in water, till they be entirely loosened, that none of the more delicate parts of the cast may be broken off or bent.

Where the alumen plumosum, or tale, cannot easily be procured, the plaster may be used alone; but it is apt to be calcined by the heat used in burning the animal or vegetable from whence the cast is taken, and to become of too incohering and crumbly a texture: or, for cheapness, Sturbridge or any other good clay, washed over till it be perfectly fine, and mixed with an equal part of sand, and some flocks cut small, may be employed. Pounded pumice-stone and plaster of Paris, taken in equal quantities, and mixed with washed clay in the same proportion, is said to make excellent molds for this and parallel uses.

Casts of medals, or such small pieces as are of a similar form, may be made in plaster by the method directed for bals reliefs.

Indeed there is nothing more required than to form a mold by laying them on a proper board; and having surrounded them by a rim made of a piece of a card, or any other pasteboard, to fill the rim with soft tempered plaster of Paris: which mold, when dry, will serve for several casts. It is nevertheless a better method to form the mold of melted sulphur; which will produce a sharper impression in the cast, and be more durable than those made of plaster.

The casts are likewise frequently made of sulphur, which being melted must be treated exactly in the same manner as the plaster.

For taking casts from medals, Dr Lewis recommends a mixture of flowers of brimstone, and red lead: equal parts of these are to be put over the fire

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Castling. in a laddle, till they soften to the consistence of pap; then they are kindled with a piece of paper, and stirred for some time. The vessel being afterwards covered close, and continued on the fire, the mixture grows fluid in a few minutes. It is then to be poured on the medal, previously oiled and wiped clean. The casts are very neat; their colour sometimes a pretty deep black, sometimes a dark grey: they are very durable; and when soiled, may be washed clean in spirits of wine.

Naturalist's Companion. Dr Letson recommends tin-foil for taking off casts from medals. The thinnest kind is to be used. It should be laid over the subject from which the impression is to be taken, and then rubbed with a brush, the point of a skewer, or a pin, till it has perfectly received the impression. The tin-foil should now be pared close to the edge of the medal, till it is brought to the same circumference: the medal must then be reversed, and the tin-foil will drop off into a chip-box or mold placed ready to receive it. Thus the concave side of the foil will be uppermost, and upon this plaster of Paris prepared in the usual manner, may be poured. When dry, the whole is to be taken out, and the tin-foil sticking on the plaster, will give a perfect representation of the medal, almost equal in beauty to silver. If the box or mold is a little larger than the medal, the plaster running round the tin-foil, will give the appearance of a white frame or circular border; whence the new made medal will appear more neat and beautiful.

Casts may be made likewise with iron, prepared in the following manner: "Take any iron-bar, or piece of a similar form; and having heated it red-hot, hold it over a vessel containing water, and touch it very slightly with a roll of sulphur, which will immediately dissolve it, and make it fall in drops into the water. As much iron as may be wanted being thus dissolved, pour the water out of the vessel; and pick out the drops formed by the melted iron from those of the sulphur, which contain little or no iron, and will be distinguishable from the other by their colour and weight." The iron will, by this means, be rendered so fusible, that it will run with less heat than is required to melt lead; and may be employed for making casts of medals, and many other such purposes, with great convenience and advantage.

Impressions of medals, having the same effect as casts, may be made also of isinglass glue, by the following means. Melt the isinglass, beaten, as when commonly used, in an earthen pipkin, with the addition of as much water as will cover it, stirring it gently till the whole is dissolved: then with a brush of camels hair, cover the medal, which should be previously well cleaned and warmed, and then laid horizontal on a board or table, greased in the part around the medal. Let them rest afterwards till the glue be properly hardened; and then, with a pin, raise the edge of it; and separate it carefully from the medal: the cast will be thus formed by the glue as hard as horn; and so light, that a thousand will scarcely weigh an ounce. In order to render the relief of the medal more apparent, a small quantity of carmine may be mixed with the melted isinglass; or

the medal may be previously coated with leaf-gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it: but the use of leaf-gold is apt to impair a little the sharpness of the impression.

Impressions of medals may be likewise taken in putty; but it should be the true kind made of calx of tin, and drying oil. These may be formed in the molds, previously taken in plaster or sulphur; or molds may be made in its own substance, in the manner directed for those of the plaster. Their impressions will be very sharp and hard; but the greatest disadvantage that attends them, is their drying very slowly, and being liable in the mean time to be damaged.

Impressions of prints, or other engravings, may be taken from copper-plates, by cleansing them thoroughly, and pouring plaster upon them: but the effect, in this way, is not strong enough for the eye; and therefore the following method is preferable, where such impressions on plaster are desired.

Take vermilion, or any other coloured pigment, finely powdered, and rub it over the plate: then pass a folded piece of paper, or the flat part of the hand, over the plate, to take off the colour from the lights or parts where there is no engraving: the proceeding must then be the same as where no colour is used. This last method is also applicable to the making of impressions of copper-plates on paper with dry colours: for the plate being prepared as here directed, and laid on the paper properly moistened, and either passed under the rolling-press, or any other way strongly forced down on the paper, an impression of the engraving will be obtained.

Impressions may be likewise taken from copper-plates, either on plaster or paper, by means of the snoko of a candle or lamp; if, instead of rubbing them with any colour, the plate be held over the candle or lamp till the whole surface become black, and then wiped off by the flat of the hand, or paper.

These methods are not, however, of great use in the case of copper-plates, except where impressions may be desired on occasions where printing-ink cannot be procured: but as they may be applied likewise to the taking impressions from innish-boxes, or other engraved subjects, by which means designs may be instantly borrowed by artists or curious persons, they may in such instances be very useful.

The expedient of taking impressions by the snoko of a candle or lamp may be employed also for botanical purposes in the case of leaves, as a perfect and durable representation of not only the general figure, but the texture and disposition of the larger fibres, may be extemporaneously obtained at any time. The same may be nevertheless done in a more perfect manner, by the use of linseed oil, either alone, or mixed with a small proportion of colour, where the oil can be conveniently procured: but the other method is valuable on account of its being practicable at almost all seasons, and in all places, within the time that the leaves will keep fresh and plump. In taking these impressions, it is proper to bruise the leaves, so as to take off the projections of the large ribs, which might prevent the other parts from lying to the paper.

Leaves, as also the petals, or flower-leaves, of plants, may themselves be preserved on paper, with their

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their original appearance, for a considerable length of time, by the following means.—Take a piece of paper, and rub it over with the isinglass glue treated as above directed for taking impressions from medals; and then lay the leaves in a proper position on the paper. The glue laid on the paper being set, brush over the leaves with more of the same; and that being dry likewise, the operation will be finished, and the leaves so secured from the air and moisture, that they will retain their figure and colour much longer than by any other treatment.

Butterflies, or other small animals of a flat figure, may also be preserved in the same manner.

CASTING is also sometimes used for the quitting, laying, or throwing aside any thing; thus deer cast their horns, snakes their skins, lobsters their shells, hawks their feathers, &c. annually.

Castling of feathers is more properly called *moulting* or *mewing*.

A horse *casts* his hair, or coat, at least once a-year, viz. in the spring when he casts his winter coat; and sometimes, at the close of autumn, he casts his summer coat, in case he has been ill kept. Horses also sometimes *cast* their hoofs, which happens frequently to coach-horses brought from Holland: these, being bred in a moist marshy country, have their hoofs too flabby; so that coming into a drier soil, and less juicy provender, their hoofs fall off, and others that are tighter succeed.

CASTING a *Colt*, denotes a mare's proving abortive.

CASTING-*Net*, a sort of fishing-net so called, because it is to be *cast*, or thrown out; which when exactly done, nothing escapes it, but weeds and every thing within its extent are brought away.

CASTLE, a fortress, or place rendered defenceable either by nature or art. It frequently signifies with us the principal mansion of noblemen. In the time of Henry II, there were no less than 1115 castles in England, each of which contained a manor.

CASTLE, in ancient writers, denotes a town or village surrounded with a ditch and wall, furnished with towers at intervals, and guarded by a body of troops. The word is originally Latin, *castellum*, a diminutive from *castrum*. *Castellum* originally seems to have signified a smaller fort for a little garrison: though Suetonius uses the word where the fortification was large enough to contain a cohort. The *castella*, according to Vegetius, were often like towns, built on the borders of the empire, and where there were constant guards and fences against the enemy. Horsey takes them for much the same with what were otherwise denominated *stations*.

CASTLE, or *Castro-fled*, is also an appellation given by the country-people in the north to the Roman *castris*, as distinguished from the *castra stationa* which they usually call *cheshers*. Horsey represents this as an useful criterion, whereby to discover or distinguish a Roman camp or station. There are several of these castella on Severus's wall: they are generally 60 feet square; their north side is formed by the wall itself which falls in with them; the intervals between them are from six furlongs and an half to seven; they seem to have stood closest where the stations are widest. The neighbouring people call them

castles or *castro-fleeds*, by which it seems probable that their ancient Latin name had been *castellum*. Some modern writers call them *milo-castles*, or military *castella*: Horsey sometimes *expiratory castles*. In these *castella* the *arcani* had their stations, who were an order of men whose business was to make incursions into the enemies country, and give intelligence of their motions.

CASTLE, in the seelanguage, is a part of the ship, of which there are two: the fore-castle, being the elevation at the prow, or the uppermost deck, towards the mizen, the place where the kitchens are. Hind-castle is the elevation which reigns on the stern, over the last deck, where the officers cabins and places of assembly are.

CASTLE (Edmund). See CASTEL.

CASTLE-Gary, a remarkable Roman station about four miles west from Falkirk on the borders of Stirlingshire in Scotland. It comprehends several acres of ground, is of a square form, and is surrounded with a wall of stone and mortar: all the space within the walls has been occupied by buildings, the ruins of which have raised the earth eight or ten feet above its natural surface; so that the fort now seems like an hill-top surrounded with a sunk fence. In 1770, some workmen employed in searching for stones for the great canal which passes very near it, discovered several apartments of stone; and in one of them a great number of stones about two feet in length, and standing erect, with marks of fire upon them, as if they had been employed in supporting some vessel under which fire was put. In a hollow of the rock near this place, in 1771, a considerable quantity of wheat quite black with age was found, with some wedges and hammers supposed to be Roman.

CASTLE-Rising, a borough-town of Norfolk in England, which sends two members to parliament. E. Long. O. 40. N. Lat. 52. 46.

CASTLE-Work, service or labour done by inferior tenants, for the building and upholding castles of defence, toward which some gave their personal assistance, and others paid their contributions. This was one of the three necessary charges to which the Anglo-Saxons were expressly subject.

CASTLETOWN, the capital of the isle of Man, seated on the south-west part of the island. It has a strong castle; but of no great importance, on account of its distance from the rocky and shallow harbour. W. Long. 4. 39. N. Lat. 53. 30.

CASTOR, or BEAVER, in zoology, a genus of quadrupeds belonging to the order of glires. The foreteeth of the upper jaw are truncated, and hollowed in a transverse angular direction. The tops of the foreteeth of the lower jaw lie in a transverse direction; and the tail is depressed. There are three species of castor, viz. 1. The fiber, with a plain ovated tail, is found on the banks of the rivers in Europe, Asia, and America. It has short ears hid in the fur; a blunt nose; the forefeet small, the hinder large: its length from nose to tail about three feet, tail about one foot. It is from the inguinal glands of this animal that the castor is obtained; it is contained in cuds or pouches resembling a dog's testicles. Nothing equals the art with which these animals

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Cassor.

mals construct their dwellings. They chuse a level piece of ground, with a small rivulet running through it. They then form into a pond, by making a dam across; first by driving into the ground stakes of five or six feet in length, placed in rows, wattling each row with pliant twigs, and filling the interstices with clay, ramming it down close. The side next the water is sloped, the other perpendicular; the bottom is from ten to twelve feet thick; but the thickness gradually diminishes to the top, which is about two or three: the length of these dams is sometimes not less than 100 feet.

Their houses are made in the water collected by means of the dam, and are placed near the edge of the shore. They are built on piles; are either round or oval; but their tops are vaulted, so that their inside resembles an oven, the top a dome. The walls are two feet thick, made of earth, stones, and sticks, most artificially laid together; and the walls within are neatly plastered as if with a trowel. In each house are two openings, the one into the water, the other towards the land. The height of these houses above the water is eight feet. They often make two or three stories in each dwelling, for the convenience of change in case of floods. Each house contains from 20 to 30 beavers; and the number of houses in each pond is from 10 to 25. Each beaver forms its bed of moss; and each family forms its magazine of winter provisions, which consist of bark and boughs of trees. Those they lodge under water, and fetch into their apartments as occasion requires. Lawson says, they are fondest of the saffraas, ash, and sweet gum. Their summer food is leaves, fruits, and sometimes crabs and craw fish; but they are not fond of fish.

To effect these works, a community of two or three hundred assembles; each bears his share in the labour; some fall to gnawing with their teeth trees of great size, to form beams or piles; others roll the pieces along to the water; others dive, and with their feet scrape holes in order to place them in; while others exert their efforts to rear them in their proper places: another party is employed in collecting twigs to wattle the piles with; a third in collecting earth, stones, and clay; a fourth is busied in beating and tempering the mortar; others in carrying it on their broad tails to proper places, and with the same instrument ram it between the piles, or plaster the inside of their houses. A certain number of smart strokes given with their tails, is a signal made by the overseer for repairing to such and such places, either for mending any defect, or at the approach of an enemy; and the whole society attend to it with the utmost assiduity. Their time of building is early in summer; for in winter they never stir but to their magazines of provisions, and during that season are very fat. They breed once a-year, and bring forth at the latter end of the winter two or three young at a birth.

Besides these associated beavers, is another sort called *terriers*, which either want industry or sagacity to form houses like the others. They burrow in the banks of rivers, making their holes beneath the freezing depth of the water, and work up for a great

number of feet. These also form their winter flock of provision.

Beavers vary in their colours; the finest are black, but the general colour is a chestnut brown, more or less dark: some have been found, but very rarely, white. The skins are a prodigious article of trade, being the foundation of the hat-manufactory. In 1763 were sold, in a single sale of the Hudson's-bay company, 54,670 skins. They are distinguished by different names. *Coat-beaver* is what has been worn as coverlets by the Indians: *Fur-chest-beaver*, because the lower side resembles it: *Stag-beaver* is the worst, and is that which the Indians kill out of season, on their stages or journeys.

In hunting the beavers, the savages sometimes shoot them, always getting on the contrary side of the wind; for they are very shy, quick in hearing, and of a keen scent. This is generally done when the beavers are at work, or on shore feeding on poplar bark. If they hear any noise when at work, they immediately jump into the water, and continue there some time; and when they rise, it is at a distance from the place where they went in.

They sometimes are taken with traps: these are nothing but poplar sticks laid in a path near the water; which when the beaver begins to feed upon, they cause a large log of wood to fall upon their necks, which is put in motion by their moving of the sticks, and consequently requires an ingenious contrivance. The savages generally prefer this way of taking them, because it does not damage their skins.

In the winter-time they break the ice in two places at a distance from the house, the one behind the other. Then they take away the broken ice with a kind of racket, the better to see where to place their stakes. They fasten their nets to these, which have large meshes, and sometimes are eighteen or twenty yards in length. When these are fixed, they proceed to demolish the house, and turn a dog therein; which terrifying the beaver, he immediately leaves it, and takes to the water; after which, he is soon entangled by the net.

2. The *muschatus*, with a long, compressed, lanceolated tail, and palmated feet. It has a long slender nose like that of a shrew-mouse; no external ears, and very small eyes. Length from nose to tail, seven inches; of the tail, eight. It is the water-rat of Clusius; and inhabits Lapland, Russia, the banks of the rivers Wolga, and the Yaick. It never wanders far from the sides; is very flow in its pace; makes holes in the cliffs, with the entrance far beneath the lowest fall of the water; works upwards, but never to the surface, only high enough to be beyond the highest flow of the river; feeds on fish; is devoured by the pikes and *fluri*, and gives those fish so strong a flavour of musk as to render them not eatable; has the same scent as the former, especially about the tail, out of which is expressed a sort of musk very much resembling the genuine kind. The skins are put into chests among clothes, to drive away moths. At Orenburg the skins and tails sell for 15 or 20 copees per hundred. They are so common near Nizney Novogorod, that the peasants bring 500 a-piece to market, where they are sold for one ruble per hundred.

Cassor.

Castor
||
Castoreum.

Castoreum
||
Castral.

hundred. The German name for these animals is *biefenratze*; the Russian, *wyechozol*.

3. The zibethicus or musk-rat, with a long, compressed, lanceolated tail, and the toes of the feet separated from each other. Length from nose to tail, one foot; of the tail, nine inches. This species inhabits North America, breeds three or four times in a year, and brings from three to six young ones at a time: during summer the male and female consort together: at the approach of winter they unite in families, and retire into small round edifices covered with a dome, formed of herbs and reeds cemented with clay: at the bottom are several pipes through which they pass in search of food: for they do not form magazines like the beavers: during winter their habitations are covered many feet deep with snow and ice; but they creep out and feed on the roots beneath: they quit their old habitations annually, and form new ones: the fur is soft and much esteemed: the whole animal, during summer, has a most exquisite smell of musk, which it loses in winter: perhaps the scent is derived from the *calamus aromaticus*, a favourite food of this animal. Lefcarbott says they are very good to eat.

CASTOR and POLLUX, in Pagan mythology. Jupiter having an amour with Leda, the wife of Tyndarus king of Sparta, in the form of a swan, she brought forth two eggs, each containing twins. From that impregnated by Jupiter proceeded Pollux and Helena, who were both immortal; from the other Castor and Clytemnestra, who being begot by Tyndarus were both mortal. They were all, however, called by the common name of *Tyndaridae*. These two brothers entered into an inviolable friendship: they went with the other noble youths of Greece in the expedition to Colchis, and, on several occasions, signalized themselves by their courage; but Castor being at length killed, Pollux obtained leave to share his own immortality with him; so that they are said to live and die alternately every day: for, being translated into the skies, they form the constellation of gemini, one of which stars rises as the other sets.

A martial dance, called the *Pyrrhic* or *Castorian* dance, was invented in honour of these deities, whom the Cephelenes placed among the Dii Magni, and offered to them white lambs. The Romans also paid them particular honours on account of the assistance they are said to have given them in an engagement against the Latins; in which, appearing mounted on white horses, they turned the scale of victory in their favour, for which a temple was erected to them in the forum.

CASTOR and Pollux, two meteors, which, in a storm at sea, appear sticking to some part of the ship, in the shape of fire-balls: when only one is seen, it is more properly called Helena. The two together are adjudged to portend the cessation of the storm; but one alone portends ill, and that the severest part of the tempest is yet to come: both these balls are by some called *Tyndarides*.

CASTOREUM, in the *Materia Medica*, CASTOR; the inguinal glands of the beaver*. The ancients had a notion that it was lodged in the testicles; and

that the animals, when hard pressed, would bite them off, and leave them to its pursuers, as if conscious of what they wanted to destroy him for. The best sort of castor is what comes from Russia. So much is Russian castor superior to the American, that two guineas per pound is paid for the former, and only 8s. 6d. for the latter. The Russian castor is in large hard round cods, which appear, when cut, full of a brittle, red, liver-coloured substance, interspersed with membranes and fibres exquisitely interwoven. An inferior sort is brought from Dantzic, and is generally fat and moist. The American castor, which is the worst of all, is in longish thin cods. Russia castor has a strong disagreeable smell; and an acrid, bitterish, and nauseous taste. Water extracts the nauseous part, with little of the finer bitter; rectified spirit extracts this last without much of the nauseous; proof spirit both: water elevates the whole of its flavour in distillation; rectified spirit brings over nothing. Castor is looked upon as one of the capital nerve and antihysterical medicines: some celebrated practitioners, nevertheless, have doubted its virtues; and Newman and Stahl declare it insignificant. Experience, however, has shewn that the virtues of castor are considerable, though less than they have been generally supposed. See *MATERIA MEDICA*, n° 224.

CASTRATION, in surgery, the operation of gelding. It was prohibited by a decree of the senate of Rome under Hadrian; and the Cornelian law subjected the person who performed the operation, to the same penalties as the person on whom it was performed, although it was done with his consent.

Castration is much in use in Asia and Turkey, where it is practised upon the slaves, to prevent any commerce with their women. In Italy, castration is frequent from another motive, namely, to preserve the voice for singing*.

Castration is sometimes found necessary in surgical cases, as in a sarcocele and cancer of the testicles.

CASTRATION, among botanists, a term derived from the fancied analogy betwixt plants and animals. The castration of plants consists in cutting off the *antheræ*, or tops of the stamina, before they have attained maturity, and dispersed the pollen or fine dust contained within their substance. This operation has been frequently practised by the moderns, with a view to establish or confute the doctrine of the sexes of plants; the antheræ or tops being considered by the sexualists as the male organs of generation. The experiment of castration succeeds principally on plants which, like the melon, have their male flowers detached from the female. In such as have both male and female flowers contained within the same covers, this operation cannot be easily performed without endangering the neighbouring organs. The result of experiments on this subject by Linnæus, Alston, and other eminent botanists, may be seen under the article BOTANY, sect. iii.

CASTREL, a kind of hawk resembling the lanner in shape, but the hobby in size. The castrel is also called *kestrel*, and is of a slow and cowardly kind; her game is the grouse, though she will kill a partridge.

CASTRES,

* See *Castor*.

* See *En-much*.

Castres
|
Castruccio.

Castruccio
|
Casualties.

CASTRES, a city of Languedoc in France, about thirty-five miles east of Thoulouse. E. Long. 2. and N. Lat. 43. 40. It is a bishop's see.

CASTRO, the capital of the island of Chiloe, on the coast of Chili in South America. W. Long. 82. S. Lat. 43.

CASTRO is also the capital of a duchy of the same name in the Pope's territories in Italy, situated on the confines of Tuscany. E. Long. 12. 35. N. Lat. 42. 30.

CASTRUCCIO (Castracani), a celebrated Italian general, was born (nobody knows of whom) at Lucca in Florence in 1284, and left in a vineyard covered with leaves, where he was found by Dianora a widow lady, the sister of Antonio, a canon of St Michael in Lucca, who was defended from the illustrious family of the Castracani. The lady having no children, they resolved to bring him up, and educated him as carefully as he had been their own. They intended him for a priest; but he was scarcely 14 years old when he began to devote himself to military sports, and those violent exercises which suited his great strength of body. The factions named the *Guelphs* and *Gibelines* then shared all Italy between them; divided the Popes and the Emperors; and engaged in their different interests not only the members of the same town, but even those of the same family. Francisco, a considerable person on the side of the Gibelines, observing Castruccio's uncommon spirit and great qualities, prevailed with Antonio to let him turn soldier; on which Castruccio soon became acquainted with every thing belonging to that profession, and was made a lieutenant of a company of foot by Francisco Guinigi. In his first campaign he gave such proofs of his courage and conduct as spread his fame all over Lombardy; and Guinigi, dying soon after, committed to him the care of his son and the management of his estate. Still distinguishing himself by his exploits, he filled his commander in chief with such jealousy and envy, that he was imprisoned by stratagem in order to be put to death. But the people of Lucca soon released him, and afterwards chose him for their sovereign prince. The Gibelines considered him as the chief of their party; and those who had been banished from their country fled to him for protection, and unanimously promised, that if he could restore them to their estates, they would serve him so effectually that the sovereignty of their country should be his reward: Flattered by these promises, he entered into a league with the prince of Milan. He kept his army constantly on foot, employing it as best suited his own designs. For services he had done the Pope, he was made senator of Rome with more than ordinary ceremony; but, while there, received news which obliged him to hasten back to Lucca. The Florentines entered into a war with him, but Castruccio fought his way through them; and the supreme authority of Tuscany was ready to fall into his hands, when a period was put to his life. In May 1328, he gained a complete victory over his enemies, who amounted to 30,000 foot, and 10,000 horse; in which 22,000 of them were slain, with the loss of not quite 16,000 of his own men: but as he was returning from the field of battle, tired with the action, and covered

with sweat, he halted a little, in order to thank and caress his soldiers as they passed; when, the north wind blowing upon him, he was immediately seized with an ague, which he at first neglected, but it carried him off in a few days, in the 44th year of his age.

Machiavel, who has written the life of Castruccio, says, that he was not only an extraordinary man in his own age, but would have been so in any other. He was of a noble aspect, and of the most winning address. He had all the qualities that make a man great; was grateful to his friends, just to his subjects, terrible to his enemies. No man was more forward to encounter dangers; no man more careful to escape them. He had an uncommon preference of mind, and often made rapartees with great smartness. Some of them are recorded, which discover a singular turn of humour; and, for a specimen, we shall mention three or four of them.—Passing one day through a street where there was a house of bad fame, he surprised a young man, who was just coming out, and who, upon seeing him, was all over blushes and confusion: "Friend, you should not be ashamed when you come out, but when you go in."—One asking a favour of him with a thousand impertinent and superfluous words: "Hark you, friend; when you would have any thing with me for the future, send another man to ask it."—Another great talker having tired him with a tedious discourse, excused himself at last, by saying, he was afraid he had been troublesome. "No indeed, (replied he), for I did not mind one word you said."—He was forced to put a citizen of Lucca to death, who had formerly been a great instrument of his advancement; and being reproached by somebody for having dealt so severely with an old friend, replied, "No, you are mistaken, it was with a new foe."—One of his courtiers desirous to regale him, made a ball and invited him to it. Castruccio came, entertained himself among the ladies, danced, and did other things which did not seem to comport with the dignity of his rank. One of his friends intimating that such freedoms might diminish the reverence that ought to be paid him: "I thank you for your caution; but he who is reckoned wise all the day, will never be reckoned a fool at night."

CASU-CONSULTI, in law, a writ of entry granted where a tenant, by courtesy or for life, aliens either in fee, in tail, or for the term of another's life. It is brought by him in reversion against the person to whom such tenant does so alien to the prejudice of the reversioner in the tenant's life-time.

CASU-PROVISIO, in law, a writ of entry founded on the statute of Gloucester, where a tenant in dower aliens the lands she so holds in fee, or for life; and lies for the party in reversion against the alienor.

CASUAL, something that happens fortuitously, without any design, or any measures taken to bring it to pass.

CASUAL-REVENUES, are those which arise from forfeitures, confiscations, deaths, attainders, &c.

CASUAL THEOLOGY, a denomination given to what is more frequently called **CASISTRY**.

CASUALTIES OF SUPERIORITY, in Scots law, those

Casualty
Cat.

those duties and emoluments which a superior has a right to demand out of his vassal's estate, over and besides the constant yearly duties established by the rendering of his charter upon certain casual events.

CASUALTY, in a general sense, denotes an accident, or a thing happening by chance, not design. It is particularly used for an accident producing unnatural death.

CASUALTY, in Metallurgy. See **CAUSALTY**.

CASUIST, a person who propoies to resolve cases of conscience. Elcobar has made a collection of the opinions of all the casuists before him. M. Le Feore, preceptor of Lewis XIII. called the books of the casuists the art of quibbling with God; which does not seem far from truth, by reason of the multitude of distinctions and subtleties they abound withal. Mayer has published a bibliotheca of casuists, containing an account of all the writers on cases of conscience, ranged under three heads, the first comprehending the Lutheran, the second the Calvinist, and the third the Romish casuists.

CASUISTRY, the doctrine and science of conscience and its cases, with the rules and principles of resolving the same; drawn partly from natural reason or equity; partly from authority of scripture, the canon law, councils, fathers, &c. To casuistry belongs the decision of all difficulties arising about what a man may lawfully do or not do; what is sin or not sin; what things a man is obliged to do in order to discharge his duty, and what he may let alone without breach of it.

CASIUS AMISSIIONIS, in Scots law, in actions proving the tenor of obligations inextinguishable by the debtors retiring or cancelling them, it is necessary for the pursuer, before he is allowed a proof of the tenor, to condescend upon such a *casus amissionis*, or accident, by which the writing was destroyed, as shews it was lost while in the writer's possession.

CAT, in zoology. See **FELIS**.

CAT, in sea-affairs, a ship employed in the coal-trade, formed from the Norwegian model. It is distinguished by a narrow stern, projecting quarters, a deep *waist*, and by having ornamental figures on the prow. These vessels are generally built remarkably strong, and carry from four to six hundred tons, or, in the language of their own mariners, from 20 to 30 *kels* of coals.

CAT, is also a sort of strong tackle, or combination of pulleys, to hook and draw the anchor perpendicularly up to the *cat-head*. The use of this machine is represented, Plate LXXXII. fig. 4.

CAT-Fish, in ichthyology. See **SQUALUS**.

CAT-Gut, a denomination given to small strings for fiddles, and other instruments, made of the intestines of sheep or lambs, dried and twisted together, either singly, or several together. These are sometimes coloured red, sometimes blue, but are commonly left whitish or brownish, the natural colour of the gut. They are also used by watch-makers, cutlers, turners, and other artificers. Great quantities are imported into England, and other northern countries from Lyons and Italy.

CAT-Harpings, a purchase of ropes employed to brace in the shrouds of the lower masts behind their

yards for the double purpose of making the shrouds more tight, and of affording room to draw in the yards more obliquely, to trim the sails for a side-wind, when they are laid to be close hauled.

CAT-bleads, two strong short beams of timber, which project almost horizontally over the ship's bows on each side of the bow-sprit; being like two radii which extend from a center taken in the direction of the bow-sprit. That part of the cat-head which rests upon the forecable, is securely bolted to the beams; the other part projects like a crane as above described, and carries in its extremity two or three small wheels or *sheaves* of brais or strong wood, about which a rope called the *cat-fall* passes, and communicates with the cat-block, which also contains three sheaves. The machine formed by this combination of pulleys is called the *Cat*, which serves to pull the anchor up to the cat-head, without tearing the ship's sides with its flukes. The cat-head also serves to suspend the anchor clear of the bow, when it is necessary to let it go: it is supported by a sort of knee, which is generally ornamented with sculpture.

The cat-block is filled with a large and strong hook, which catches the ring of the anchor when it is to be drawn up.

CAT of the Mountain. See **FELIS**.

CAT-Mint. See **MENTHA**.

CAT-Salt, a name given by our salt-workers to a very beautifully granulated kind of common salt. It is formed out of the bittern, or leach-brine, which runs from the salt when taken out of the pan. When they draw out the common salt from the boiling pans, they put it into long wooden troughs, with holes bored at the bottom for the brine to drain out; under these troughs are placed vessels to receive this brine, and across them small sticks to which the cat-salt affixes itself in very large and beautiful crystals. This salt contains some portion of the bitter purging salt, is very sharp and pungent, and is white when powdered, though pellucid in the mass. It is used by some for the table, but the greatest part of what is made of it is used by the makers of hard-soap.

CAT-Silver. See **MICA**.

CATACAUSTIC CURVES, in the higher geometry, that species of caustic curves which are formed by reflection. See **FLUXIONS**.

CATACHRESIS, in rhetoric, a trope which borrows the name of one thing to express another. Thus Milton, describing Raphael's descent from the empyreal heaven to paradise, says,

"Down thither prone in flight,

"He speeds, and through the vast ethereal sky

"Sails between worlds and worlds."

CATACOMB, a grotto, or subterraneous place for the burial of the dead.

Some derive the word *catacomb* from the place where ships are laid up, which the modern Latins and Greeks call *cumbæ*. Others say, that *cata* was used for *ad*, and *catacumbas* for *adumbas*: accordingly, Dadin says, they anciently wrote *cataumbas*. Others fetch the word from the Greek *κρυα*, and *κρησος*, a hollow, cavity, or the like.

Anciently the word *catacomb* was only understood of the tombs of St Peter and St Paul; and M. Chastelain

Cat
Catacomb.

Plate lxxxii.
fig. 4.

Catacombs. Iain observes, that, among the more knowing of the people of Rome, the word *catacomb* is never applied to the subterraneous burying-places hereafter mentioned, but only to a chapel in St Sebastian, one of the seven national churches; where the ancient Roman calendars lay the body of St Peter was deposited, under the consulate of Tullius and Bassus, in 258.

CATACOMBS of Italy; a vast assemblage of subterranean sepulchres about Rome, chiefly at about three miles from that city in the Via Appia; supposed to be the sepulchres of the martyrs; and which are visited accordingly out of devotion, and relics thence taken and dispersed throughout the catholic countries after having been first baptized by the Pope under the name of some saint. These *catacombs* are said by many to be caves or cells wherein the primitive Christians hid and assembled themselves together, and where they interred such among them as were martyred. Each *catacomb* is three feet broad, and eight or ten high; running in form of an alley or gallery, and communicating with others: in many places they extend within a league of Rome. There is no masonry or vaulting therein, but each supports itself: the two sides, which we may look on as the *parietes* or walls, were the places where the dead were deposited; which were laid lengthwise, three or four rows over one another, in the same *catacomb*, parallel to the alley. They were commonly closed with large thick tiles, and sometimes pieces of marble, cemented in a manner inimitable by the moderns. Sometimes, tho' very rarely, the name of the deceased is found on the tile: frequently a palm is seen, painted or engraven, or the cipher Xp, which is commonly read *pro Christo*. The opinion held by many Protestant authors is, that the *catacombs* are heathen sepulchres, and the same with the *puticuli* mentioned by Festus Pompeius; maintaining, that whereas it was the practice of the ancient Romans to burn their dead, the custom was, to avoid expence, to throw the bodies of their slaves to rot in holes of the ground; and that the Roman Christians, observing, at length, the great veneration paid to relics, resolved to have a stock of their own: entering, therefore, the *catacombs*, they added what ciphers and inscriptions they pleased; and then shut them up again, to be opened on a favourable occasion. Those in the secret, add they, dying or removing, the contrivance was forgot, till chance opened them at last. But this opinion has even less of probability than the former. Mr Monro, in the *Philosophical Transactions*, supposes the *catacombs* to have been originally the common sepulchres of the first Romans, and dug in consequence of these two opinions, *viz.* That shades hate the light; and that they love to hover about the places where the bodies are laid.

Though the catacombs of Rome have made the greatest noise of any in the world, there are such belonging to many other cities. Those of Naples, according to bishop Burnet, are much more noble and spacious than the catacombs of Rome. Catacombs have also been discovered at Syracuse, and Catania in Sicily, and in the island of Malta. The Roman catacombs take particular names from the churches in their neighbourhood, and seem to divide

the circumference of the city without the walls between them, extending their galleries every where under, and a vast way from it; so that all the ground under Rome, and for many miles about it, some say 20, is hollow. The largest, and those commonly shewn to strangers, are the catacombs of San Sebastiano, those of Saint Agnese, and the others in the fields a little off Saint Agnese. Women are only allowed to go into the catacombs in the church-yard of the Vatican on Whitfun-Monday, under pain of excommunication. There are men kept constantly at work in the *catacombs*. As soon as these labourers discover a grave with any of the supposed marks of a saint upon it, intimation is given to the cardinal Comerlingo, who immediately sends men of reputation to the place, where finding the palm, the monogram, the coloured glass, &c. the remains of the body are taken up with great respect, and translated to Rome. After the labourers have examined a gallery, they stop up the entry that leads to it; so that most of them remain thus closed up; only a few being left open, to keep up the trade of shewing them to strangers. This they do to prevent people from losing themselves in these subterraneous labyrinths, which indeed has often happened; but more probably to deprive the public of the means of knowing whither and how far the catacombs are carried.

The method of preserving the dead in catacombs seems to have been common to a number of the ancient nations. The catacombs of Egypt are still extant, about nine leagues from the city of Grand Cairo, and two miles from the city of Zaccara. They extend from thence to the pyramids of Pharaoh, which are about eight miles distant. They lie in a field covered with a fine running sand, of a yellowish colour. The country is dry and hilly; the entrance of the tomb is choked up with sand; there are many open, but more that are still concealed.

The bodies found in catacombs, especially those of Egypt, are called *mummies*; and as their flesh was formerly reckoned an efficacious medicine, they were much sought after. In this work the labourers were often obliged to clear away the sand for weeks together, without finding what they wanted. Upon coming to a little square opening of about 18 feet in depth, they descend into it by holes for the feet, placed at proper intervals; and there they are sure of finding a mummy. These caves, or *wells*, as they call them there, are hollowed out of a white freestone, which is found in all this country a few feet below the covering of sand. When one gets to the bottom of these, which are sometimes 40 feet below the surface, there are several square openings on each side, into passages of 10 or 15 feet wide; and these lead to chambers of 15 or 20 feet square. These are all hewn out into the rock; and in each of the catacombs are to be found several of these apartments communicating with one another. They extend a great way under ground, so as to be under the city of Memphis, and in a manner to undermine its environs. In some of the chambers the walls are adorned with figures and hieroglyphics; in others the mummies are found in tombs, round the apartment hollowed out in the rock.

Cataleptis
Catalonia.

The Egyptians seem to have excelled in the art of embalming and preserving their dead bodies; as the mummies found in the Egyptian catacombs are in a better state than the bodies found either in the Italian catacombs, or those of any other part of the world. See EMBALMING and MUMMY.

Laying up the bodies in caves, is certainly the original way of disposing of the dead; and appears to have been propagated by the Phœnicians throughout the countries to which they sent colonies: the interring as we now do, in the open air, or in temples, was first introduced by the Christians. When an ancient hero died or was killed in a foreign expedition, as his body was liable to corruption, and for that reason unfit to be transported entire, they fell on the expedient of burning, in order to bring home the ashes, to oblige the *manes* to follow; that so his country might not be destitute of the benefit of his tutelage. It was thus burning seems to have had its original; and by degrees it became common to all who could bear the expences of it, and took place of the ancient burying: thus *catacombs* became disused among the Romans, after they had borrowed the manner of burning from the Greeks, and then none but slaves were laid in the ground. See BURIAL, &c.

CATALEPSIS, *καταληψις*, or CATALEPSY, in medicine, a kind of apoplexy; or a drowsy disease, wherein the patient is taken speechless, senseless, and fixed in the same posture wherein the disease first seized him; his eyes open, without seeing or understanding. See (Index subjoined to) MEDICINE.

CATALOGUE, a list or enumeration of the names of several books, men, or other things, according to a certain order.

CATALONIA, a province of Spain, bounded on the north by the Pyrenean mountains, which divide it from France; by the kingdom of Arragon and Valencia on the west; and by the Mediterranean sea on the south and east. It is 155 miles in length, and 100 in breadth. It is watered by a great number of rivers; the principal of which are the Lobregat, the Ter, the Tet, and the Segra. The air is temperate and healthy; but the land is mountainous, except in a few places. It produces, however, corn, wine, oil, pulse, flax, and hemp, sufficient for the inhabitants. The mountains are covered with large forests of tall trees, such as the oak, the ever-green oak, the beech, the pine, the fir, the chestnut, and many others; with cork-trees, shrubs, and medicinal plants. There are several quarries of marble of all colours, crystal, alabaster, amethysts, and lapis lazuli. Gold dust has been found among the sands of one or two of the rivers; and there are mines of tin, iron, lead, alum, vitriol, and salt. They likewise fish for coral on the eastern coast. The inhabitants are hardy, courageous, active, vigorous, and good soldiers, but apt to be discontented. The miquelets are a sort of soldiers which guard the passes over the mountains, and ought to protect travellers; but if they are not paid to their minds, they seldom fail to pay themselves. The river Lobregat divides Catalonia into two parts, the east and west, according to their situation. This province comprehends 17 vigueries or territories; two of which are in Roussillon, and belong to the French.

The rest are subject to the Spaniards. The principal towns are Barcelona the capital, Tarragona, Tortosa, Lerida, Solsona, Cardona Vich, Girona, Seu d'Urgel, Pui Cerdà, and Cervera.

CATAMENIA, in medicine. See MENSES.

CATAMITE, a boy kept for sodomitical practices.

CATANANCHE, CANDIA LIONS-FOOT; a genus of the polygamia æqualis order, belonging to the lychnædia class of plants. There are three species, of which the cerulea is the most remarkable. This sends out many long, narrow, hairy leaves, which are jagged on their edges like those of the buckhorn plantain, but broader; the jags are deeper, and at greater distances; these lie flat on the ground, turning their points upwards. Between the leaves come out the flower-stalks, which are in number proportionable to the size of the plants; for, from an old thriving root, there are frequently eight or ten, while young plants do not send out above two or three. These stalks rise near two feet high, dividing into many small branches upward, garnished with leaves like those below, but smaller, and without jags on their edges: each of these smaller branches are terminated by single heads of flowers, of a fine blue colour. This is a perennial plant, and may be propagated by seeds or slips. The seeds may be sown, in the spring, on a bed of common earth; and, in the autumn following, the plants may be removed to the places where they are to remain. The seeds ripen in August. This plant is a pretty ornament in gardens, and is easily kept within bounds.

CATANEA, a city of Sicily, seated on a gulph of the same name, near the foot of Mount Etna or Gibel. It suffered greatly by earthquakes in 1669 and 1693. This last overturned the city in a moment. Eighteen thousand of the inhabitants perished in the ruins, and yet the fertility of the soil has caused it to be re-peopled. E. Long. 15. 19. N. Lat. 37. 30.

CATANZARO, a city in the kingdom of Naples, the capital of Calabria Ulterior, with a bishop's see. It is the usual residence of the governor of the province, and is seated on a mountain, in E. Long. 18. 20. N. Lat. 38. 58.

CATAPHONICS, the science which considers the properties of reflected sounds. See ACOUSTICS.

CATAPHORA, in medicine, the same as COMA.

CATAPHRACTA, in antiquity, a kind of coat of mail, which, covered the soldier from head to foot. Hence cataphracts were horsemen armed with the cataphracts; whose horses, as Sallust says, were covered with linen full of iron plates disposed like feathers.

CATAPLASMA, a poultice; from *καταπλάσσω*, *illino*, to spread like a plaster. Cataplasms take their name sometimes from the part to which they are applied or effects they produce; so are called anacolema, frontale, epicarpium, epispasticum, vesicatorium; and, when mustard is an ingredient, they are called sinapisms.

These kind of applications are softer, and more easy, than plasters or ointments. They are formed of some vegetable substances, and applied of such a consistence as neither to adhere nor run: they are also

Cataplasma
|
Catapulta.

Catapulta.

also more useful when the intention is effected by the perpetuity of the heat or cold which they contain, for they retain them longer than any other kind of composition.

When designed to *relax*, or to promote suppuration, they should be applied warm. Their warmth, moisture, and the obstruction they give to perspiration, is the method of their answering that end. The proper heat, when applied warm, is no more than to promote a kindly pleasant sensation; for great heat prevents the design for which they are used. They should be renewed as often as they cool. For relaxing and suppurating, none excel the whitebread poultice, made with the crumb of an old loaf, a sufficient quantity of milk to boil the bread in until it is soft, and a little oil; which last ingredient, besides preventing the poultice from drying and sticking to the skin, also retains the heat longer than the bread and milk alone would do. To preserve the heat longer, the poultice, when applied, may be covered with a strong ox's bladder.

When designed to *repel*, they should be applied cold, and ought to be renewed as oft as they become warm. A proper composition for this end, is a mixture of oat-meal and vinegar.

CATAPULTA, in antiquity, a military engine contrived for the throwing of arrows, darts, and stones upon the enemy.—Some of these engines were of such force that they would throw stones of an hundred weight. Josephus takes notice of the surprising effects of these engines, and says, that the stones thrown out of them beat down the battlements, knocked off the angles of the towers, and would level a whole file of men from one end to the other, was the phalanx ever so deep. This was called the

Battering CATAPULTA, and is represented on Plate LXXII. fig. 1. This catapulta is supposed to carry a stone, &c. of an hundred weight, and therefore a description of it will be sufficient to explain the doctrine of all the rest; for such as threw stones of twelve-hundred and upwards were constructed on the same principles.

The base is composed of two large beams 2, 3. The length of those beams is fifteen diameters of the bore of the capitals 9. At the two extremities of each beam, two double mortises are cut to receive the eight tenons of two cross beams, each of them four of the diameters in length. In the centre of each of the beams of the base, and near two thirds of their length, a hole, perfectly round, and 16 inches in diameter, should be bored: these holes must be exactly opposite to each other, and should increase gradually to the inside of the beams, so that each of them, being 16 inches on the outside towards the capitals 9, should be $1\frac{1}{2}$ at the opening on the inside, and the edges carefully rounded off. The capitals 9 are, in a manner, the soul of the machine, and serve to twist and strain the cordage, which form its principle or power of motion.

The capitals are either of cast brass, or iron; each consisting of a wheel with teeth, C 10, of $2\frac{1}{2}$ inches thick. The hollow or bore of these wheels should be 11 $\frac{1}{2}$ inches in diameter, perfectly round, and the edges smoothed down. As the friction would be too great,

if the capitals rubbed against the beams by the extreme straining of the cordage, which draws them towards these beams, that inconvenience is remedied by the means of eight friction-wheels, or cylinders of brass, about the 13th of an inch in diameter, and an inch and one sixth in length, placed circularly, and turning upon axes, as represented at D 13, and B 12. One of these friction-wheels at large with its screw, by which it is fastened into the beam, is represented at A.

Upon this number of cylindrical wheels the capitals 9 must be placed in the beams 2, 3, so that the cylinders do not extend to the teeth of the wheels, which must receive a strong pinion 14. By the means of this pinion the wheel of the capital is made to turn for straining the cordage with the key 15. The capital wheel has a strong catch 16, and another of the same kind may be added to prevent any thing from giving way through the extreme and violent force of the strained cordage.

The capital-piece of the machine is a nut or cross-pin of iron, 17, seen at C, and hammered cold into its form. It divides the bore of the capitals exactly in two equal parts, and fixed in grooves about an inch deep. This piece, or nut, ought to be about two inches and one third thick at the top 18, as represented in the section at B; and rounded off and polished as much as possible, that the cords folded over it may not be hurt or cut by the roughness or edges of the iron. Its height ought to be eight inches, decreasing gradually in thickness to the bottom, where it ought to be only one inch. It must be very exactly inserted in the capitals.

After placing the two capitals in the holes of the two beams in a right line with each other, and fixing the two cross diametrical nuts or pieces over which the cordage is to wind, one end of the cord is reeved through a hole in one of the capitals in the base, and made fast to a nail within-side of the beam. The other side of the cord is then carried through the hole in the opposite beam and capital, and so wound over the cross-pieces of iron in the centre of the two capitals, till they are full, the cordage forming a large skain. The tension or straining of the cordage ought to be exactly equal, that is, the several foldings of the cord over the capital-pieces should be equally strained, and so near each other as not to leave the least space between them. As soon as the first folding or skain of cord has filled up one whole space or breadth of the capital-pieces, another must be carried over it; and so on, always equally straining the end till no more will pass through the capitals, and the skain of cordage entirely fills them, observing to rub it from time to time with soap.

At three or four inches behind the cordage, thus wound over the capital pieces, two very strong upright beams 21 are raised: these are posts of oak 14 inches thick, crossed over at top by another of the same solidity. The height of the upright beams is $7\frac{1}{2}$ diameters; each supported behind with very strong props 25, fixed at bottom in the extremities of the base 2, 3. The cross-beam 24 is supported in the same manner by a prop in the centre.

The tree, arm, or stylus 22, should be of found ash. Its length is from 15 to 16 diameters of the bore

Catapulta
Catáro.

of the capitals. The end at the bottom, or that fixed in the middle of the ikain, is 10 inches thick, and 14 broad. To strengthen the arm or tree, it should be wrapped round with a cloth dipped in strong glue, like the tree of a fiddle, and bound very hard with waxed thread of the sixth of an inch in diameter from the large end at bottom, almost to the top, as represented in the figure.

At the top of the arm, just under the iron-hand or receiver 27, a strong cord is fastened, with two loops twisted one within another, for the greater strength. Into these two loops the hook of a brass pulley 23 is put. The cord 20 is then reeved through the pulley, and fastened to the roll 30. The cock or trigger 31, which serves as a stay, is then brought to it, and made fast by its hook to the extremity of the hand 27, in which the body to be discharged is placed. The pulley at the neck of the arm is then unhooked; and when the trigger is to let it off, a stroke must be given upon it with an iron-bar or crow of about an inch in diameter; on which the arm flies up with a force almost equal to that of a modern mortar. The cushion or stomacher 23, placed exactly in the middle of the cross-beam 24, should be covered with tanned ox-hide, and stuffed with hair, the arm striking against it with inconceivable force. It is to be observed, that the tree or arm 22 describes an angle of 90 degrees, beginning at the cock, and ending at the stomacher or cushion.

CATAPULTA for *Arrows, Spears or Darts*. Some of the spears, &c. thrown by these engines, are said to have been 18 feet long, and to have been thrown with such velocity as to take fire in their course.

Plate lxxii.
fig. 2.

A B C D is the frame that holds the darts or arrows, which may be of different numbers, and placed in different directions. E F is a large and strong iron spring, which is bent by a rope that goes over three pulleys, I, K, L; and is drawn by one or several men; this rope may be fastened to a pin at M. The rope, therefore, being set at liberty, the spring must strike the darts with great violence, and send them, with surprising velocity, to a great distance. This instrument differs in some particulars from the description we have of that of the ancients; principally in the throwing of several darts at the same time, one only being thrown by theirs.

CATARACT, in hydrography, a precipice in the channel of a river, caused by rocks, or other obstacles, stopping the course of the stream, from whence the water falls with a greater noise and impetuosity: Such are the cataracts of the Nile, the Danube, Rhine, and the famous one of Niagara in America.

CATARACT, in medicine and surgery, a disorder of the humours of the eye, by which the pupilla, that ought to appear transparent and black, looks opaque, blue, grey, brown, &c. by which vision is variously impeded, or totally destroyed. See **SURGERY**.

CATARO, a town of Dalmatia, and capital of the territory of the same name, with a strong castle, and a bishop's see. It is subject to Venice, and seated on a gulph of the same name. E. Long. 19. 19. N. Lat. 42. 25.

CATARACTES, in ornithology, the trivial name *Cataractes* of a species of **LARUS**.

CALARRH, in medicine, a distillation or defluxion from the head upon the mouth and aspera arteria, and through them upon the lungs. See (the *Index* subjoined to) **MEDICINE**.

CATASTASIS, in poetry, the third part of the ancient drama; being that wherein the intrigue, or action, set forth in the epitasis, is supported, carried on, and heightened, till it be ripe for the unravelling in the catastrophe. Scudiger defines it, the full growth of the fable, while things are at a stand in that confusion to which the poet has brought them.

CATASTROPHE, in dramatic poetry, the fourth and last part in the ancient drama, or, that immediately succeeding the catastasis: or according to others, the third only; the whole drama being divided into protasis, epitasis, and catastrophe; or, in the terms of Aristotle, prologue, epilogue, and exode.

The catastrophe clears up every thing, and is nothing else but the discovery or winding up of the plot. It has its peculiar place: for it ought entirely to be contained, not only in the last act, but in the very conclusion of it; and when the plot is finished, the play should be so also. The catastrophe ought to turn upon a single point, or start up on a sudden.

The great art in the catastrophe is, that the clearing up of all difficulties may appear wonderful, and yet easy, simple, and natural.

It is a very preposterous artifice of some writers to shew the catastrophe in the very title of the play. Mr Dryden thinks that a catastrophe refusing from a mere change in the sentiments and resolutions of a person, without any other machinery, may be so managed as to be exceeding beautiful.

It is a dispute among the critics, whether the catastrophe should always fall out favourably on the side of virtue or not. The reasons on the negative side seem the strongest. Aristotle prefers a shocking catastrophe to a happy one.—The catastrophe is either simple or complex. The first is that in which there is no change in the state of the principal persons, nor any discovery or unravelling, the plot being only a mere passage out of agitation into quiet repose. In the second, the principal persons undergo a change of fortune, in the manner already defined.

CATCH, in the musical sense of the word, a fugue in the unison, wherein, to humour some conceit in the words, the melody is broken, and the sense interrupted in one part, and caught again or supported by another; as in the catch in Shakespeare's play of the twelfth-night, where there is a catch sung by three persons, in which the humour is, that each who sings, calls and is called *knave* in turn.

CATCH-Fly, in botany. See **LYCHNIS**.

CATCH-Pole, (quasi one that *catches* by the *pole*), a term used, by way of reproach, for the bailiff's follower or assistant.

CATCH-Word, among printers, that placed at the bottom of each page, being always the first word of the following page.

CATECHESIS, in a general sense, denotes an instruction given any person in the first rudiments of an art or science; but more particularly of the Christian religion

Cataractes
↑
Catechesis.

Catechetic
Catechumen.
men.

Catechumen.
Catenaria.

religion. In the ancient church, catechesis was an instruction given *viva voce* , either to children, or adult heathens, preparatory to their receiving of baptism. In this sense, *catechesis* stands contra-distin-
guished from *mystagogica* , which was a higher part of instruction given to those already initiated, and containing the mysteries of faith. Those who give such instructions are called *catechists* ; and those who receive them, *catechumens* .

CATECHETIC, or CATECHETICAL, something that relates to oral instruction in the rudiments of Christianity.—Catechetic schools were buildings appointed for the office of the catechist, adjoining to the church, and called *catechumenæ* : such was that in which Origen and many other famous men read catechetical lectures at Alexandria. See CATECHUMEN.

CATECHISM, in its primary sense, an instruction, or institution, in the principles of the Christian religion, delivered *viva voce* , and so as to require frequent repetitions, from the disciple or hearer, of what has been said. The word is formed from *καταρχη* , a compound of *κατα* and *αρχη* , q. d. *circum foris* , alluding to the noise or din made in this sort of exercise, or to the zeal and earnestness wherewith things are to be inculcated over and over on the learners.—Anciently the candidates for baptism were only to be instructed in the secrets of their religion by tradition *viva voce* , without writing; as had also been the case among the Egyptian priests, and the British and Gaulish druids, who only communicated the mysteries of their theology by word of mouth.

CATECHISM is more frequently used in modern times for an elementary book, wherein the principal articles of religion are summarily delivered in the way of question and answer.

CATECHIST, *κατηχηστας, catecheta* , he that catechises, i. e. he that instructs novices in the principles of religion.

CATECHIST more particularly denotes a person appointed by the church to instruct those intended for baptism, by word of mouth, in the fundamental articles of the Christian faith.—The catechists of churches were ministers usually distinct from the bishops and presbyters, and had their auditories or *catechumenæ* apart. Their business was to instruct the catechumens, and prepare them for the reception of baptism. But the catechists did not constitute any distinct order of the clergy, but were chosen out of any other order. The bishop himself sometimes performed the office; at other times presbyters, or even readers or deacons, were the catechists. Origen seems to have had no higher degree in the church than reader, when he was made catechist at Alexandria, being only 18 years of age, and consequently incapable of the deaconship.

CATECHU, in the materia medica, the name of a troche consisting of Japan earth and gum arabic, each two ounces, and of sugar of roses sixteen ounces, beat together with a little water. It is recommended as a mild restraining, &c.

CATECHUMEN, a candidate for baptism, or one who prepares himself for the receiving thereof.

The catechumens, in church-history, were the lowest order of Christians in the primitive church. They

had some title to the common name of Christian, being a degree above pagans and heretics, though not consummated by baptism. They were admitted to the state of catechumens by the imposition of hands, and the sign of the cross. The children of believing parents were admitted catechumens, as soon as ever they were capable of instruction: but at what age those of heathen parents might be admitted, is not so clear. As to the time of their continuance in this state, there were no general rules fixed about it; but the practice varied according to the difference of times and places, and the readiness and proficiency of the catechumens themselves.

There were four orders or degrees of catechumens; the first were those instructed privately without the church, and kept at a distance for some time from the privilege of entering the church, to make them the more eager and desirous of it. The next degree were the *audientes* , so called from their being admitted to hear sermons, and the scriptures read in the church, but were not allowed to partake of the prayers. The third sort of catechumens were the *genu-flectentes* , so called because they received imposition of hands kneeling. The fourth order was the *competentes & electi* , denoting the immediate candidates for baptism, or such as were appointed to be baptized the next approaching festival; before which, strict examination was made into their proficiency under the several stages of catechetical exercises.

After examination, they were exercised for twenty days together, and were obliged to fasting and confession: some days before baptism they went veiled; and it was customary to touch their ears, saying, *Ephatha* , i. e. Be opened; as also to anoint their eyes with clay; both ceremonies being in imitation of our Saviour's practice, and intended to shadow out to the catechumens their condition both before and after their admission into the Christian church.

CATEGORICAL, in a general sense, is applied to those things ranged under a CATEGORY.

CATEGORICAL also imports a thing to be absolute, not relative; in which sense it stands opposed to *hypothetical* . We say, a *categorical* proposition, a *categorical* syllogism, &c.

A *categorical* answer denotes an express and pertinent answer made to any question or objection proposed.

CATEGORY, in logic, a series or order of all the predicates or attributes contained under any genus.

The school-philosophers distribute all the objects of our thoughts and ideas into certain *genera* or *classes* , not so much, say they, to learn what they do not know, as to communicate a distinct notion of what they do know: and these classes the Greeks called *categories* , and the Latins *predicaments* .

Aristotle made ten categories, viz. quantity, quality, relation, action, passion, time, place, situation, and habit, which are usually expressed by the following technical distich:

*Arbor, sex, servus, ardore, refrigerat, usus,
Ruri cras stans, nec tunicatus ero.*

CATEK. See BENGAL, n° 4.

CATENARIA, in the higher geometry, the name of a curve-line formed by a rope hanging freely from two

two

Caterpillar
|
Caterpillar-
Eater.

two points of suspension, whether the points be horizontal or not. See FLUXIONS.

CATERPILLAR, in zoology, the name of all winged insects when in their reptile or worm-state. See ERUCA.

Method of Destroying CATERPILLARS on Trees.—Take a chafing dish with lighted charcoal, and placing it under the branches that are loaded with caterpillars, throw some pinches of brimstone upon the coals. The vapour of the sulphur, which is mortal to these insects, will not only destroy all that are on the tree, but prevent it from being infested with them afterwards. A pound of sulphur will clear as many trees as grow on several acres. This method has been successfully tried in France. In the *Journal Oeconomique*, the following is said to be infallible against the caterpillars feeding on cabbage, and perhaps may be equally serviceable against those that infest other vegetables. Sow with hemp all the borders of the ground where you mean to plant your cabbage; and, although the neighbourhood is infested with caterpillars, the space inclosed by the hemp will be perfectly free, not one of the vermin will approach it.

CATERPILLAR-Eaters, a name given by some authors to a species of worms bred in the body of the caterpillar, and which eat its flesh: these are owing to a certain kind of fly that lodges her eggs in the body of this animal, and they, after their proper changes, become flies like their parents.

Mr Reaumur has given us, in his history of insects, some very curious particulars in regard to these little worms. Every one of them, he observes, spins itself a very beautiful case of a cylindric figure, made of a very strong sort of silk: these are the cases in which this animal spends its state of chrysalis; and they have a mark by which they may be known from all other animal productions of this kind, which is, that they have always a broad stripe or band surrounding their middle, which is black when the rest of the case is white, and white when that is black. Mr Reaumur has had the pains and patience to find out the reason of this singularity, which is this: the whole shell is spun of a silk produced out of the creature's body; this at first runs all white, and towards the end of the spinning turns black. The outside of the case must necessarily be formed first, as the creature works from within: consequently this is truly white all over, but it is transparent, and shows the last spun or black silk through it. It might be supposed that the whole inside of the shell should be black; but this is not the case: the whole is fashioned before this black silk comes; and this is employed by the creature, not to line the whole, but to fortify certain parts only; and therefore is all applied either to the middle, or to the two ends omitting the middle; and so gives either a black band in the middle, or a blackness at both ends, leaving the white in the middle to appear. It is not unfrequent to find a sort of small cases, lying about garden-walks, which move of themselves; when these are opened, they are found to contain a small living worm. This is one of the species of these caterpillar-eaters; which, as soon as it comes out of the body of that animal, spins itself a case for its transformation

Catebæa
|
Catherine.

long before that happens, and lives in it without food till that change comes on; and it becomes a fly like that to which it owed its birth.

CATESBÆA, the **LILY-THORN**; a genus of the monogynia order, belonging to the tetrandria class of plants. There is only one species, viz. the spinosa, which was discovered in the island of Providence by Mr Cateby, who gathered the seeds, and brought them to England. It rises to the height of ten or twelve feet, and is covered with a pale russet bark; the branches come out alternately, and are garnished with small leaves resembling those of the box-tree, coming out in clusters all round the branches at certain distances; the flowers hang downward, and come out from the side of the branches: they are tubulous, and near six inches long, very narrow at their base, but widening upwards towards the top, where it is divided into four parts which spread open, and are reflexed backward. They are of a dull yellow colour. This plant is propagated by seeds which must be procured from the country where it grows. The seeds must be sown on a hot-bed, and are to be treated in the same manner as other tender exotics.

CATHÆRETICS, in pharmacy, medicines of a caustic nature, serving to eat off proud flesh.

CATHARTICS, in medicine, remedies which promote evacuation by stool. See MATERIA MEDICA, n° 54, &c.

CATHECU, in botany. See ARECA.

CATHEDRA, in a general sense, a chair.—The word is more particularly used for a professor's chair, and a preacher's pulpit.

CATHEDRA is also used for the bishop's see, or throne, in a church.

CATHEDRAL, a church wherein is a bishop's see or seat: See CHURCH, and BISHOP. The word comes from the Greek *καθίδρα*, "chair," of *καθίσταμαι*, *sedeo*, "I sit." The denomination *cathedral* seems to have taken its rise from the manner of sitting in the ancient churches, or assemblies of primitive Christians: in these, the council, i. e. the elders and priests, was called *Presbyterium*; at their head was the bishop, who held the place of chairman, *Cathedralis*, or *Cathedraticus*; and the presbyters, who sat on either side, were also called by the ancient fathers, *Assessores Episcoporum*. The episcopal authority did not reside in the bishop alone; but in all the presbyters, whereof the bishop was president. A *cathedral* therefore, originally, was different from what it is now; the Christians, till the time of Constantine, having no liberty to build any temple: by their churches they only meant their assemblies; and by *cathedrals*, nothing more than consistories.

CATHERINE PARR, daughter of Sir Thomas Parr, and widow of Nevil Lord Latimer, became afterward the 6th wife of Henry VIII. whom she had the great good fortune to survive, after having been in no small danger on account of her inclination to the reformed doctrines. Upon Henry's death, she married Lord Seymour, brother to the Duke of Somerset, and died in child-bed in 1548. This queen published *Prayers*, or *Meditations*, &c. 12mo, 1545; and among her papers after her death, there was found a contrite meditation on the years she had passed in popery, entitled,

Catherine
|
Cathetus.

Cathetus
|
Cato.

titled, *Queen Catharine Parr's Lamentation of a Sinner, bewailing the ignorance of her blind life*. This was published, with a preface by the great Lord Burleigh, 8vo, 1548, and 1563.

CATHERINE I. *Empress of Russia*, was raised to that dignity, from the low condition of a menial servant, by the discerning Peter the Great, who married her in 1711. She attended the Emperor in all his expeditions; and when he was surrounded by the Turks on the banks of the Pruth, his army was saved by her prudent advice. Peter, afterwards, never resolved on any affair of consequence without first consulting her; success attended him in every thing, and the court of Peterburgh appeared in a new light. He instituted the order of St Katherine in her honour, which gave her power to bestow on such of her sex as the judged proper; and, finally, appointed her his successor. On the death of her husband, she took all proper means to secure the quiet, advance the civilization, and promote the general welfare, of her kingdom; and it is more than probable, that the reigning illustrious Empress Catherine II. has considered her as a bright example: for Catherine I. established the academy of sciences at Peterburgh, now brought to such perfection. She likewise increased the naval force of Russia; and set on foot a design for discovering the north-east passage to China. "The lenity of this princess," (says Voltaire, in his *Life of Peter the Great*), "was carried to a degree unparalleled in the history of any nation. She promised, that, during her reign, nobody should be put to death; and she kept her word: she was the first sovereign that ever shewed this respect to the human species. Malefactors were condemned to work in the mines, and other public works; a regulation not less prudent than humane, since their punishment was rendered of some advantage to the state." She died on the 17th of May 1727; leaving issue, Anne who married Frederic Duke of Holstein, and Elizabeth the late Empress of Russia.

CATHERLOUGH, a town of Ireland, in the county of Catherlough, and province of Leinster; seated on the river Barrow, 16 miles N. E. of Kilkenny. W. Long. 7. 1. N. Lat. 52. 45.

CATHERLOUGH, a county of Ireland, about 28 miles in length, and 8 in breadth; bounded on the east by Wicklow and Wexford, on the west by Queen's county, on the north by Kildare, and on the south and south-west by Wexford. It contains 5600 houses, 42 parishes, five baronies, or boroughs, and sends six members to parliament, viz. two for the county, two for Catherlough, and two for Old Leighlin.

CATHETER, in surgery, a fistulous instrument, usually made of silver, to be introduced into the bladder, in order to search for the stone, or discharge the urine when suppressed.

CATHETUS, in geometry, a line or radius falling perpendicularly on another line or surface; thus the catheti of a right-angled triangle, are the two sides that include the right angle.

CATHETUS of Incidence, in catoptrics, a right line drawn from a point of the object, perpendicular to the reflecting line.

CATHETUS of Reflexion, or of the Eye, a right line

drawn from the eye perpendicular to the reflecting plane.

CATHETUS of Obliquation, a right line drawn perpendicular to the speculum, in the point of incidence or reflection.

CATHETUS, in architecture, a perpendicular line, supposed to pass through the middle of a cylindrical body, as a balluster, column, &c.

CATHNESS. See CATNESS.

CATHOLIC, in a general sense, denotes any thing that is universal or general.

CATHOLIC Church. The rise of heresies induced the primitive Christian church to assume to itself the appellation of *catholic*, being a characteristic to distinguish itself from all sects, who, though they had party names, sometimes sheltered themselves under the name of Christians.

The Romish church distinguishes itself now by the name of *catholic*, in opposition to all those who have separated from her communion, and whom she considers as heretics and schismatics, and herself only as the true and Christian church. In the strict sense of the word, there is no catholic church in being, that is, no universal Christian communion.

CATHOLIC King, a title which hath been hereditary to the Kings of Spain, ever since Alphonsus, who, having gained several victories over the Saracens, and re-established the Christian faith in Spain, was honoured with the title of Catholic. Some say it was in the time of Ferdinand and Isabella.

CATHOLICON, in pharmacy, a kind of soft purgative electuary, so called, as being supposed an universal purger of all humours.

CATILINE (Lucius), a Roman of a noble family, who having spent his whole fortune in debauchery, formed the design of oppressing his country, destroying the senate, seizing the public treasury, setting Rome on fire, and usurping a sovereign power over his fellow-citizens. In order to succeed in this design, he drew some young noblemen into his plot; whom he prevailed upon, it is said, to drink human blood as a pledge of their union. His conspiracy, however, was discovered by the vigilance of Cicero, who was then consul. Upon which, retiring from Rome, he put himself at the head of an army, with several of the conspirators, and fought with incredible valour against Petreus, lieutenant to Anthony, who was colleague with Cicero in the consulship; but was defeated and killed in battle.—Sallust has given an excellent history of this conspiracy.

CATO (Marcus Portius), the Censor, one of the greatest men among the ancients, was born at Tusculum in the year of Rome 519, about the 232^d before Christ. He began to bear arms at 17; and, on all occasions, shewed extraordinary courage. He was a man of great sobriety, and reckoned no bodily exercise unworthy of him. He had but one horse for himself and his baggage, and he looked after and dressed it himself. At his return from his campaigns, he betook himself to plough his ground; not that he was without slaves to do it, but it was his inclination. He dressed also like his slaves, sat down at the same table with them, and partook of the same fare. He did not in the mean while neglect to cultivate

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tivate his mind, especially in regard to the art of speaking; and he employed his talents, which were very great, in generously pleading causes in the neighbouring cities, without fee or reward. Valerius Flaccus, who had a country-seat near Cato, conceiving an esteem for him, persuaded him to come to Rome; where Cato, by his own merit, and the influence of so powerful a patron, was soon taken notice of, and promoted. He was first of all elected tribune of the soldiers for the province of Sicily. He was next made questor in Africa under Scipio. Having in this last office reproved him for his profuse-ness to his soldiers, the general answered, that "he did not want so exact a questor, but would make war at what expence he pleased; nor was he to give an account to the Roman people of the money he spent, but of his enterprises, and the execution of them." Cato, provoked at this answer, left Sicily, and returned to Rome.

Afterwards Cato was made prætor, when he fulfilled the duties of his office with the strictest justice. He conquered Sardinia, governed with admirable moderation, and was created consul. Being tribune in the war of Syria, he gave distinguished proofs of his valour against Antiochus the Great; and at his return stood candidate for the office of censor. But the nobles, who not only envied him as a new man, but dreaded his severity, set up against him seven powerful competitors. Valerius Flaccus, who had introduced him into public life, and had been his colleague in the consulship, was a ninth candidate, and these two united their interests. On this occasion Cato, far from employing soft words to the people, or giving hopes of gentleness or complaisance in the execution of his office, loudly declared from the rostra, with a threatening look and voice, "That the times required firm and vigorous magistrates, to put a stop to that growing luxury which menaced the republic with ruin; censors who would cut up the evil by the roots, and restore the rigour of ancient discipline." It is to the honour of the people of Rome, that, notwithstanding these terrible intimations, they preferred him to all his competitors, who courted them by promises of a mild and easy administration: the comitia also appointed his friend Valerius to be his colleague, without whom he had declared that he could not hope to compass the reformations he had in view. Cato's merit, upon the whole, was superior to that of any of the great men who stood against him. He was temperate, brave, and indefatigable; frugal of the public money, and not to be corrupted. There is scarce any talent requisite for public or private life which he had not received from nature, or acquired by industry. He was a great soldier, an able statesman, an eloquent orator, a learned historian, and very knowing in rural affairs. Yet, with all these accomplishments, he had very great faults. His ambition being poisoned with envy, disturbed both his own peace and that of the whole city as long as he lived. Though he would not take bribes, he was unmerciful and unconscionable in amassing wealth by all such means as the law did not punish.

The first act of Cato in his new office, was naming his colleague to be prince of the senate: after which

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the censors struck out of the list of the senators the names of seven persons; among whom was Lucius the brother of T. Flaminius. Lucius, when consul, and commanding in Gaul, had with his own hand murdered a Boian of distinction, a defector to the Romans; and he had committed this murder purely to gratify the curiosity of his pathic, a young Carthaginian, who, longing to see some body die a violent death, had reproached the general for bringing him away from Rome just when there was going to be a fight of gladiators. Titus Flaminius, full of indignation at the dishonour done to his brother, brought the affair before the people; and insisted upon Cato's giving the reason of his proceeding. The censor related the story; and when Lucius denied the fact, put him to his oath. The accused, refusing to swear, was deemed guilty; and Cato's censure was approved. But no part of the censor's conduct seemed so cruel to the nobles and their wives, as the taxes he laid upon luxury in all its branches; dress, household-furniture, women's toilets, chariots, slaves, and equipage. These articles were all taxed at three per cent. of the real value. The people, however, in general, were pleased with his regulations; inasmuch that they ordered a statue to be erected to his honour in the temple of *Health*, with an inscription that mentioned nothing of his victories or triumph, but imposed only that by his wife ordinances in his censorship he had reformed the manners of the republic. Plutarch relates, that before this, upon some of Cato's friends expressing their surprise, that while many persons without merit or reputation had statues, he had none; he answered, "I had much rather it should be asked why the people have not erected a statue to Cato, than why they have." Cato was the occasion of the third Punic war. Being dispatched to Africa to terminate a difference between the Carthaginians and the king of Numidia, on his return to Rome he reported, that Carthage was grown excessively rich and populous, and he warmly exhorted the senate to destroy a city and republic, during the existence of which, Rome could never be safe. Having brought from Africa some very large figs, he shewed them to the conscript fathers in one of the lappets of his gown. "The country, (says he), where this fine fruit grows, is but a three days voyage from Rome." We are told, that from this time he never spoke in the senate upon any subject, without concluding with these words, "I am also of opinion, that Carthage ought to be destroyed." He judged, that, for a people debauched by prosperity, nothing was more to be feared than a rival state, always powerful, and now from its misfortunes grown wise and circumspect. He held it necessary to remove all dangers that could be apprehended from *without*, when the republic had *within* so many distempers threatening her destruction.

From the censor dignified and severe, the reader will not perhaps be displeased to turn his view upon Cato sociable and relaxed. For we should have a false notion of him, if we imagined that nothing but a sad austerity prevailed in his speech and behaviour. On the contrary, he was extremely free; and often with his friends at table intermixed the conversation with lively discourses and witty sayings. Of these Plutarch

has

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Oeuvres
diverses,
P. 49.

has collected a pretty large number; we shall relate but one, and make use of Balzac's paraphrase, and the preface with which he introduces it. "The very censurers, though I hadness seemed to be one of the functions of their office, did not altogether lay aside railery. They were not always bent upon severity; and the first Cato, that troublefome and intolerable honest man, ceased sometimes to be troublefome and intolerable. He had some glimpses of mirth, and some intervals of good humour. He dropped now and then some words that were not unpleasant, and you may judge of the rest by this. He had married a very handsome wife; and history tells us that she was extremely afraid of the thunder, and loved her husband well. These two passions prompted her to the same thing; she always pitched upon her husband as a sanctuary against thunder, and threw herself into his arms at the first noise she fancied she heard in the sky. Cato, who was well pleased with the storm, and very willing to be careless, could not conceal his joy. He revealed that domestic secret to his friends; and told them one day, speaking of his wife, "that she had found out a way to make him love bad weather; and that he never was so happy as when Jupiter was angry." It is worth observing, that this was during his censorship; when he degraded the senator Manlius, who would probably have been consul the year after, only for giving a kiss to his wife in the day-time, and in the presence of his daughter.

Cato died in the year of Rome 604, aged 85. He wrote several works. 1. A Roman history. 2. Concerning the art of war. 3. Of rhetoric. 4. A treatise of husbandry. Of these, the last only is extant.

CATO (Marcus Porcius), commonly called *Cato minor*, or Cato of *Utica*, was great grandson of Cato the censor. It is said, that from his infancy he discovered, by his speech, by his countenance, and even his childish sports and recreations, an inflexibility of mind; for he would force himself to go through with whatever he had undertaken, though the task was ill-suited to his strength. He was rough towards those that flattered him, and quite untractable when threatened; was rarely seen to laugh, or even to smile; was not easily provoked to anger; but if once incensed, hard to be pacified. Sylla having had a friendship for the father of Cato, sent often for him and his brother, and talked familiarly with them. Cato, who was then about 14 years of age, seeing the heads of great men brought there, and observing the sighs of those that were present, asked his preceptor, "Why does no body kill this man?" Because, said the other, he is more feared than he is hated. The boy replied, Why then did you not give me a sword when you brought me hither, that I might have flabbed him, and freed my country from this slavery?

He learned the principles of the Stoic philosophy, which so well suited his character, under Antipater of Tyre, and applied himself diligently to the study of it. Eloquence he likewise studied, as a necessary means to defend the cause of justice, and he made a very considerable proficiency in that science. To increase his bodily strength, he inured himself to suffer the extremes of heat and cold; and used to make journeys on foot, and bare-headed in all seasons. When

he was sick, patience and abstinence were his only remedies: he shut himself up, and would see no body till he was well. Though remarkably sober in the beginning of his life, making it a rule to drink but once after supper, and then retire, he insensibly contracted a habit of drinking more freely, and of sitting at table till morning. His friends endeavoured to excuse this, by saying that the affairs of the public engrossed his attention all the day; and that, being ambitious of knowledge, he passed the night in the conversation of philosophers. Cæsar wrote that Cato was once found dead drunk at the corner of a street, early in the morning, by a great number of people who were going to the levee of some great man; and that when, by uncovering his face, they perceived who it was, they blushed for shame: "You would have thought, (added Cæsar), that Cato had found them drunk, not they him." Pliny observes, that by this reflection Cæsar praises his enemy at the same time that he blames him. And Seneca, his extravagant panegyrist, ventures to assert, that it is easier to prove drunkenness to be a virtue, than Cato to be vicious. He affected singularity, and, in things indifferent, to act directly contrary to the taste and fashions of the age. Magnanimity and constancy are generally ascribed to him; and Seneca would fain make that haughtiness and contempt for others, which in Cato accompanied those virtues, a matter of praise. Cato, says Seneca, having received a blow in the face, neither took revenge nor was angry; he did not even *pardon the affront*, but *denied that he had received it*. His virtue raised him so high, that injury could not reach him. He is reputed to have been chaste in his youth. His first love was Lepida; but when the marriage was upon the point of being concluded, Metellus Scipio, to whom she had been promised, interfered, and the preference was given to him. This affront extremely exasperated our Stoic. He was for going to law with Scipio; and when his friends had diverted him from that design, by shewing him the ridicule of it, he revenged himself by making verses upon his rival. When this first flame subsided, he married Attilia the daughter of Serranus, had two children by her, and afterwards divorced her for her very indifcreet conduct.

He served as a volunteer under Gallius in the war of Spartacus; and when military rewards were offered him by the commander, he refused them, because he thought he had no right to them. Some years after, he went a legionary tribune into Macedonia under the prætor Rubrius: in which station he appeared, in his dress, and during a march, more like a private soldier than an officer: but the dignity of his manners, the elevation of his sentiments, and the superiority of his views, set him far above those who bore the titles of generals and proconsuls. It is said, that Cato's design in all his behaviour was to engage the soldiers to the love of virtue; whose affections he engaged thereby to himself, without his having that in his intention. "For the sincere love of virtue, (adds Plutarch), implies an affection for the virtuous. Those who praise the worthy without loving them, pay homage to their glory; but are neither admirers, nor imitators of their virtues." When the time of

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his service expired, and he was leaving the army, the soldiers were all in tears ; so effectually had he gained their hearts by his condescending manners, and sharing in their labours. After his return home, he was chosen to the questorship ; and had scarce entered on his charge, when he made a great reformation in the questor's office, and particularly with regard to the registers. These registers, whose places were for life, and through whose hands passed incessantly all the public accounts, being to act under young magistrates unexperienced in business, assumed an air of importance ; and, instead of asking orders from the questors, pretended to direct and govern as if they themselves were the questors. Cato reduced them to their proper sphere.

One thing by which Cato extremely pleased the people, was his making the assassins to whom Sylla had given considerable rewards out of the treasury, for murdering the proscribed, disgorge their gains. Plutarch tells us, that Cato was so exact in discharging the duties of a senator, as to be always the first who came to the house, and the last who left it ; and that he never quitted Rome during those days when the senate was to sit. Nor did he fail to be present at every assembly of the people, that he might save those who, by an ill-judged facility, bestowed the public money in largesses, and frequently, through mere favour, granted remission of debts due to the state. At first his austerity and stiffness displeased his colleagues ; but afterwards they were glad to have his name to oppose to all the unjust solicitations, against which they would have found it difficult to defend themselves. Cato very readily took upon him the task of refusing.

Cato, to keep out a very bad man, put in for the tribunate. He sided with Cicero against Catiline, and opposed Cæsar on that occasion. His enemies sent him to recover Cyprus, which Ptolemy had forfeited, thinking to hurt his reputation by so difficult an undertaking ; yet none could find fault with his conduct.

Cato laboured to bring about an agreement between Cæsar and Pompey ; but seeing it in vain, he sided with the latter. When Pompey was slain, he fled to Utica ; and being pursued by Cæsar, advised his friends to be gone, and throw themselves on Cæsar's clemency. His son, however, remained with him ; and Statilius, a young man, remarkable for his hatred to Cæsar.

The evening before the execution of the purpose he had formed with regard to himself, after bathing, he supped with his friends, and the magistrates of the city. They sat late at table, and the conversation was lively. The discourse falling upon this maxim of the Stoics, that " the wife man alone is free, " and that the vicious are slaves," Demetrius, who was a Peripatetic, undertook to confute it from the maxims of his school. Cato, in answer, treated the matter very amply ; and with so much earnestness and vehemence of voice, that he betrayed himself, and confirmed the suspicions of his friends, that he designed to kill himself. When he had done speaking, a melancholy silence ensued ; and Cato perceiving it, turned the discourse to the present situation of affairs,

expressing his concern for those who had been obliged to put to sea, as well as for those who had determined to make their escape by land, had a dry and sandy desert to pass. After supper, the company being dismissed, he walked for some time with a few friends, and gave his orders to the officers of the guard : and going into his chamber, he embraced his son and his friends with more than usual tenderness, which farther confirmed the suspicions of the resolution he had taken. Then laying himself down on his bed, he took up Plato's Dialogue on the Immortality of the Soul. Having read for some time, he looked up, and missing his sword, which his son had removed while he was at supper, he called a slave, and asked who had taken it away ; and receiving no pertinent answer, he resumed his reading. Some time after, he asked again for his sword ; and, without shewing any impatience, ordered it to be brought to him : but, having read out the book, and finding nobody had brought him his sword, he called for all his servants, fell into a rage, and struck one of them on the mouth with so much violence, that he very much hurt his own hand, crying out in a passionate manner, " What ! do my own son and family conspire to betray me, and deliver me up naked and unarmed to the enemy ? " Immediately his son and friends rushed into the room ; and began to lament, and to beseech him to change his resolution. Cato raising himself, and looking fiercely at them, " How long is it, said he, since I have lost my senses, and my son is become my keeper ? Brave and generous son, why do you not bind your father's hands, that when Cæsar comes, he may find me unable to defend myself ? Do you imagine that without a sword I cannot end my life ? Cannot I destroy myself by holding my breath for some moments, or by striking my head against the wall ? " His son answered with his tears, and retired. Apollonides and Demetrius remained with him, and to them he addressed himself in the following words : " Is it to watch over me that you sit silent here ? Do you pretend to force a man of my years to live ? or can you bring any reason to prove, that it is not base and unworthy of Cato to beg his safety of an enemy ? or why do you not persuade me to unlearn what I have been taught, that, rejecting all the opinions I have hitherto defended, I may now, by Cæsar's means, grow wiser, and be yet more obliged to him than for life alone ? Not that I have determined any thing concerning myself ; but I would have it in my power to perform what I shall think fit to resolve upon : and I shall not fail to ask your counsel, when I have occasion to act up to the principles which your philosophy teaches. Go tell my son, that he should not compel his father to what he cannot persuade him." They withdrew, and the sword was brought by a young slave. Cato drew it, and finding the point to be sharp ; " Now, (said he,) I am my own master." And, laying it down, he took up his book again, which, it is reported, he read twice over. After this he slept so soundly that he was heard to snore by those who were near him. About midnight he called two of his freedmen, Cleantes his physician, and Butas whom he chiefly employed in the management of his affairs. The last he sent to the port, to see whether all the

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Romans were gone; to the physician he gave his hand to be dressed, which was twelled by the blow he had given his slave. This being an intimation that he intended to live, gave great joy to his family. Butas soon returned, and brought word that they were all gone except Crassus, who had staid upon some business, but was just ready to depart. He added, that the wind was high, and the sea rough. These words drew a sigh from Cato. He sent Butas again to the port to know, whether there might not be some one, who, in the hurry of embarkation, had forgot some necessary provisions, and had been obliged to put back to Utica. It was now break of day, and Cato slept yet a little more, till Butas returned to tell him, that all was perfectly quiet. He then ordered him to shut his door; and he flung himself upon his bed, as if he meant to finish his night's rest; but immediately he took his sword, and stabbed himself a little below his chest; yet not being able to use his hand so well by reason of the swelling, the blow did not kill him. It threw him into a convulsion, in which he fell from his

bed, and overturned a table near it. The noise gave the alarm; and his son, and the rest of the family, entering the room, found him weltering in his blood, and his bowels half cut of his body. The surgeon, upon examination, found that his bowels were not cut; and was preparing to replace them, and bind up the wound, when Cato, recovering his senses, thrust the surgeon from him, and, tearing out his bowels, immediately expired, in the 48th year of his age.

By this rash act, independent of all moral or religious considerations, he carried his patriotism to the highest degree of political frenzy: for Cato, dead, could be of no use to his country; but, had he preserved his life, his counsel might have moderated Caesar's ambition, and (as Montesquieu observes) have given a different turn to public affairs.

CATOCHE, or CATOCHEUS, a disease, by which the patient is rendered in an instant as immoveable as a statue, without either sense or motion, and continues in the same posture he was in at the moment of his being seized. See (the *Index* subjoined to) MEDICINE.

CATOPTRICS.

CATOPTRICS is that part of optics which explains the properties of reflected light, and particularly that which is reflected from mirrors.

As this and the other branches of OPTICS are fully treated under the collective word, we shall, in the present article, 1st, Just give a summary of the principles of the branch, in a few plain aphorisms, with some preliminary definitions; and, 2^{dly}, Insert a list of entertaining experiments founded upon them.

SECT. I. Definitions.

Definitions. 1. Every polished body that reflects the rays of light is called a mirror, whether its surface be plane, spherical, conical, cylindric, or of any other form whatever.

Plate lxiii. 2. Of mirrors there are three principally used in optical experiments, which are, the plane mirror, GHI, (fig. 3.) the spherical convex mirror, GHI, (fig. 4.) and the spherical concave mirror, GHI, (fig. 5.)

3. The point K, (fig. 4, 5.) round which the reflecting surface of a spherical mirror is described, is called its centre. The line KH, drawn from its center perpendicular to its two surfaces, is the axis of the mirror, and the point H, to which that line is drawn, is its vortex.

4. The distance between the lines AG and BG, (fig. 3.) is called the angle of incidence, and the distance between BG and CG is the angle of reflection.

SECT. II. Aphorisms.

I. In a plain mirror. 1. The image DF, (fig. 3.) will appear as far behind the mirror, as the object AC is before it.

2. The image will appear of the same size, and in the same position as the object.

3. Every such mirror will reflect the image of an object of twice its own length and breadth.

4. If the object be an opaque body, and its rays fall on the mirror nearly in direct lines, there will be only one image visible, which will be reflected by the inner surface of the glass. But

5. If the object be a luminous body, and its rays fall very obliquely on the mirror, there will appear, to an eye placed in a proper position, several images; the first of which, reflected from the outer surface of the glass, will not be so bright as the second, reflected from the inner surface. The following images, that are produced by the repeated reflections of the rays between the two surfaces of the glass, will be in proportion less vivid, to the eighth or tenth, which will be scarce visible.

1. The image DF, (fig. 4.) will always appear behind it.

2. The image will be in the same position as the object.

3. It will be less than the object.

4. It will be curved, but not, as the mirror, spherically.

5. Parallel rays falling on this mirror will have the focus or image at half the distance of the center K, from the mirror.

6. In converging rays, the distance of the object must be equal to half the distance of the center, to make the image appear behind the mirror.

7. Diverging rays will have their image at less than half the distance of the center. If the object be placed in the center of the mirror, its image will appear at one-eighth of that distance behind it.

1. That point where the image appears of the same dimensions as the object, is the center of that mirror.

2. Parallel rays will have their focus at one half the distance of the center.

3. Converging rays will form an image before the mirror.

4. In diverging rays, if the object be at less than one half the distance of the center, the image will be behind

behind the mirror, erect, curved, and magnified, as DEF, (fig. 5.) but if the distance of the object be greater, the image will be before the mirror, inverted and diminished, as DEF, (fig. 6.)

5. The sun's rays falling on a concave mirror, and being parallel, will be collected in a focus at half the distance of its center, where their heat will be augmented in proportion of the surface of the mirror to that of the focal spot.

6. If a luminous body be placed in the focus of a concave mirror, its rays being reflected in parallel lines, will strongly enlighten a space of the same dimension with the mirror, at a great distance. If the luminous object be placed nearer than the focus, its rays will diverge, and consequently enlighten a larger space. It is on this principle, that reverberators are constructed.

IV. In all plane and spherical mirrors the angle of incidence is equal to the angle of reflection.

SECT. III. Entertaining Experiments.

5
I. Catop-
tical illu-
sions.

I. Of all our senses the sight is certainly subject to the greatest illusion. The various writers on optics have described a great number of instances in which it deceives us, and have constantly endeavoured to investigate the causes, to explain their effects, and to reconcile appearance with reality. We every day discover new phenomena, and doubtless many more are reserved for posterity. It frequently happens, moreover, that a discovery which at first seemed of little consequence, has led to matters of the highest importance.

Plate lxxiii.

Take a glass bottle A, (fig. 4.) and fill it with water to the point B; leave the upper part BC empty, and cork it in the common manner. Place this bottle opposite a concave mirror, and beyond its focus, that it may appear reversed, and before the mirror (see sect. ii. aphor. 4. of aspher. concave mirror,) place yourself still further distant than the bottle, and it will appear to you in the situation *a, b, c*, (fig. 5.)

Now it is remarkable in this apparent bottle, that the water, which, according to all the laws of catoptrics, and all the experiments made on other objects, should appear at *a b*, appears on the contrary at *b c*, and consequently the part *a b* appears empty.

If the bottle be inverted and placed before the mirror, (as in fig. 6.) its image will appear in its natural, erect position; and the water, which is in reality at BC, will appear at *a b*.

If while the bottle is inverted it be uncorked, and the water run gently out, it will appear that while the part BC is emptying, that of *a b* in the image is filling; and what is likewise very remarkable, as soon as the bottle is empty the illusion ceases, the image also appearing entirely empty. If the bottle likewise be quite full there is no illusion.

If while the bottle is held inverted, and partly empty, some drops of water fall from the bottom A towards BC, it seems in the image as if there were formed at the bottom of the part *a b*, bubbles of air that rose from *a* to *b*; which is the part that seems full of water. All these phenomena constantly appear.

The remarkable circumstances in this experiment, are, first, not only to see an object where it is not, but also where its image is not; and secondly, that of two objects which are really in the same place, as the surface of the bottle and the water it contains, the one is seen at one place, and the other at another; and to see the bottle in the place of its image, and the water where neither it, nor its image, are.

11. Construct a box AB, of about a foot long, eight inches wide, and six high; or what other dimension you shall think fit, provided it does not greatly vary from these proportions.

On the inside of this box, and against each of its opposite ends A and B, place a mirror of the same size. Take off the quicksilver from the mirror that you place at B, for about an inch and an half, at the part C, where you are to make a hole in the box of the same size, by which you may easily view its inside. Cover the top of the box with a frame, in which must be placed a transparent glass, covered with gauze, on the side next the inner part of the box. Let there be two grooves at the parts E and F to receive the two painted scenes hereafter mentioned. On two pieces of cut pasteboard let there be skilfully painted on both sides (see fig. 8, and 9.) any subject you think proper; as woods, gardens, bowers, colonades, &c. and on two other pasteboards, the same subjects on one side only; observing that there ought to be on one of them some object relative to the subject placed at A, that the mirror placed at D may not reflect the hole at C on the opposite side.

Place the two boards painted on both sides in the grooves E and F; and those that are painted on one side only, against the opposite mirrors C and D; and then cover the box with its transparent top. This box should be placed in a strong light to have a good effect.

When the eye is placed at C, and views the objects on the inside of the box, of which some, as we have said, are painted on both sides, they are successively reflected from one mirror to the other; and if, for example, the painting consists of trees, they will appear like a very long vista, of which the eye cannot discern the end: for each of the mirrors repeating the objects, continually more faintly, contribute greatly to augment the illusion.

III. Take a square box ABCD, of about six inches long, and twelve high; cover the inside of it with four plane mirrors, which must be placed perpendicular to the bottom of the box CHFD.

Place certain objects in relief on the bottom of this box; suppose, for example, a piece of fortification, (as fig. 11.) with tents, soldiers, &c. or any other subject that you judge will produce an agreeable effect by its disposition when repeatedly reflected by the mirrors.

On the top of this box place a frame of glass, in form of the bottom part of a pyramid, whose base AGEB is equal to the size of the box: its top ILN, must form a square of six inches, and should not be more than four or five inches higher than the box. Cover the four sides of this frame with a gauze, that the inside may not be visible but at the top ILN, which should be covered with a transparent glass.

When

6
II. Appear-
ance of a
boundless
vista,
Plate lxxiii.
fig. 7.

7
III. Of a
fortification
of immense
extent,
fig. 10.

When you look into this box through the glafs ILN, the mirrors that are diametrically oppofite each other, mutually reflecting the figures inclofed, the eye beholds a boundlefs extent, completely covered with thefe objects; and if they are properly difpofed, the illufion will occafion no fmall furprize, and afford great entertainment.

Note, The nearer the opening ILN is to the top of the box, the greater will be the apparent extent of the fubject. The fame will happen if the four mirrors placed on the fides of the box be more elevated. The objects, by either of thefe difpofitions, will appear to be repeated nine, twenty-five, forty-nine times, &c. by taking always the fquare of the odd numbers of the arithmetical progreflion 3, 5, 7, 9, &c. as is very eafy to conceive, if we remember that the fubject inclofed in the box is always in the centre of a fquare, compofed of feveral others, equal to that which forms the bottom of the box.

Other pieces of the fame kind (that is viewed from above) may be contrived, in which mirrors may be placed perpendicular on a triangular, pentagon, or hexagon, (that is, a three, five, or fix-fided) plane. All thefe different difpofitions, properly directed, as well with regard to the choice as pofition of the objects, will confantly produce very remarkable and pleafing illufions.

If inftead of placing the mirrors perpendicular, they were to incline equally, fo as to form part of a reverfed pyramid, the fubject placed in the box would then have the appearance of a very extenfive globular or many-fided figure.

8
IV. Surprifing multiplication of objects, fig. 12.

IV. On the hexagonal or fix-fided plane ABCDEF draw fix femi-diameters GA, GB, GC, GD, GE, GF; and on each of thefe place perpendicularly, two plane mirrors, which muft join exactly at the center G*. Decorate the exterior boundary of this piece (which is at the extremity of the angles of the hexagon) with fix columns, that at the fame time ferve to fupport the mirrors, by grooves formed on their inner fides. (See the profile H) Add to thefe columns their entablatures, and cover the edifice in fuch manner as you fhall think proper.

In each one of thefe fix triangular fpaces, contained between two mirrors, place little figures of pafte-board, in relief, representing fuch objects as when feen in an hexagonal form will produce an agreeable effect. To thefe add fmall figures of enamel; and take particular care to conceal, by fome object that has relation to the fubject, the place where the mirrors join, which, as we have faid before, all meet in the common center G.

When you look into any one of the fix openings of this palace, the objects there contained being repeated fix times, will feem entirely to fill up the whole of the building. This illufion will appear very remarkable: efpecially if the objects made choice of are properly adapted to the effect that is to be produced by the mirrors.

Note, if you place between two of thefe mirrors part of a fortification, as a curtain and two demiba-

fions, you will fee an entire citadel, with its fix baftions. Or if you place part of a ball-room, ornamented with chandeliers and figures in enamel, all thefe objects being here multiplied, will afford a very pleafing profpect.

V. Within the cafe ABCD, place four mirrors, O, P, Q, R, fo difpofed that they may each of them make an angle of forty-five degrees, that is, that they may be half way inclined from the perpendicular, as in the figure. In each of the two extremities AB, make a circular overture, in one of which fix the tube GL, in the other the tube MP, and obferve that in each of thefe is to be inferted another tube, as H and I†.

Furnifh the firft of thefe tubes with an object-glafs at G, and a concave eye-glafs at F. You are to obferve, that in regulating the focus of thefe glaffes, with regard to the length of the tube, you are to fuppofe it equal to the line G, or vifual pointed ray, which entering at the overture G, is reflected by the four mirrors, and goes out at the other overture F, where the ocular glafs is placed. Put any glafs you will into the two ends of the moveable tubes H and I; and laftly place the machine on a ftand E, moveable at the point S, that it may be elevated or depreffed at pleafure.

When the eye is placed at F, and you look through the tube, the rays of light that proceed from the object T, paffing through the glafs G, are fucceffively reflected by the mirrors, O, P, Q, and R, to the eye at F, and there paint the object T, in its proper fituation, and thefe rays appear to proceed directly from that object.

The two moveable tubes H and I, at the extremities of each of which a glafs is placed, ferve only the more to difguife the illufion, for they have no communication with the interior part of the machine. This inftrument being moveable on the ftand E, may be directed to any object; and if furnifhed with proper glaffes will anfwer the purpofe of a common perfpective.

The two moveable tubes H and I being brought together, the machine is directed toward any object, and defiring a perfon to look in at the end F, you ask him if he fee diftinctly that object. You then feparate the two moveable tubes, and leaving a fpace between them fufficient to place your hand, or any other folid body, you tell him that the machine has the power of making objects vifible through the moft opaque body; and as a proof you defire him then to look at the fame object, when, to his great furprize, he will fee it as diftinct as when there was no folid body placed between the tubes.

Note, This experiment is the more extraordinary, as it is very difficult to conceive how the effect is produced. The two arms of the cafe appearing to be made to fupport the perfpective glafs; and to whatever object it is directed, the effect is ftill the fame.

VI. In the partition AB, make two overtures, CD, and EF, of a foot high, and ten inches wide, and

9
V. Opaque bodies feemingly rendered transparent, Plate lxxiii. fig. 1.

10
VI.VII. The magician's mirrors, about fig. 2.

* Thefe mirrors, placed back to back, muft be as thin as poffible.

† Thefe four tubes muft terminate in the fubftance of the cafe, and not enter the infide, that they may not hinder the effect of the mirrors.

about a foot distant from each other. Let them be at the common height of a man's head; and in each of them place a transparent glass, surrounded with a frame, like a common mirror.

Behind this partition place two mirrors H and I, inclined to it in an angle of forty-five degrees*: let them be both 18 inches square: let all the space between them be inclosed by boards or pasteboard, painted black, and well clofed, that no light may enter: let there be also two curtains to cover them, which may be drawn aside at pleasure.

When a person looks into one of these supposed mirrors, instead of seeing his own face, he will perceive the object that is in front of the other; so that if two persons present themselves at the same time before these mirrors, instead of each one seeing himself, they will reciprocally see each other.

Note, There should be a sconce with a candle placed on each side of the two glasses in the waincot, to enlighten the faces of the persons who look in them, otherwise this experiment will have no remarkable effect.

This experiment may be considerably improved by placing the two glasses in the partition, in adjoining rooms, and a number of persons being previously placed in one room, when a stranger enters the other, you may tell him his face is dirty, and desire him to look in the glass, which he will naturally do; and on seeing a strange face he will draw back: but returning to it, and seeing another, another, and another, like the phantom kings in Macbeth, what his surprize will be is more easy to conceive than express. After this, a real mirror may be privately let down on the back of the glass; and if he can be prevailed to look in it once more, he will then, to his further astonishment, see his own face; and may be told, perhaps persuaded, that all he thought he saw before was mere imagination.

How many tricks, less artful than this, have passed in former times for sorcery; and pass at this time, in some countries, for apparitions?

Note, When a man looks in a mirror that is placed perpendicular to another, his face will appear entirely deformed. If the mirror be a little inclined, so as to make an angle of eighty degrees (that is, one-ninth part from the perpendicular) he will then see all the parts of his face, except the nose and forehead. If it be inclined to sixty degrees (that is, one-third part) he will appear with three noses and six eyes: in short, the apparent deformity will vary at each degree of inclination; and when the glass comes to forty-five degrees, (that is, half way down) the face will vanish. If, instead of placing the two mirrors in this situation, they are so disposed that their junction may be vertical, their different inclinations will produce other effects; as the situation of the object relative to these mirrors is quite different. The effects of these mirrors, though remarkable enough, occasions but little surprize, as there is no method of concealing the cause by which they are produced.

Fig. 3. VII. Make a box of wood, of a cubical figure, ACBD, of about fifteen inches every way. Let it be fixed on the pedestal P, at the usual height of a man's

head. In each side of this box let there be an opening of an oval form, of ten inches high, and seven wide.

In this box place two mirrors A, D, with their backs against each other; let them cross the box in a diagonal line, and in a vertical position. Decorate the openings in the sides of this box with four oval frames and transparent glasses, and cover each of them with a curtain, so contrived that they may all draw up together.

Place four persons in front of the four sides, and at equal distances from the box, and then draw up the curtains that they may see themselves in the mirrors; when each of them, instead of his own figure, will see that of the person who is next him, and who, at the same time, will seem to him to be placed on the opposite side. Their confusion will be the greater, as it will be very difficult for them to discover the mirrors concealed in the box. The reason of this phenomenon is evident; for though the rays of light may be turned aside by a mirror, yet, as we have before said, they always appear to proceed in right lines.

VIII. Provide a box ABCD of about two feet long, twelve inches wide, and twelve inches high. At the end AC place a concave mirror, the focus of whose parallel rays is at eighteen inches from the reflecting surface. At IL place a pasteboard blacked, in which a hole is cut sufficiently large to see on the mirror H, the object placed at BEFD.

12
VIII. The perspective mirror; fig. 7.

Cover the top of the box, from A to I, close, that the mirror H may be entirely darkened. The other part IB, must be covered with a glass, under which is placed a gauze.

Make an aperture at G, near the top of the side E B; beneath which, on the inside, place, in succession, paintings of different subjects, as vistas, landscapes, &c. so that they may be in front of the mirror H. Let the box be so placed that the object may be strongly illumined be the sun, or by wax lights placed under the enclosed part of the box AL.

By this simple construction the objects placed at GD will be thrown into their natural perspective; and if the subjects be properly chosen, the appearance will be altogether as pleasing as in optical machines of a much more complicated form.

Note, A glass mirror should be always here used, as those of metal do not represent the objects with equal vivacity, and are beside subject to tarnish. It is also necessary that the box be sufficiently large, that you may not be obliged to use a mirror whose focus is too short; for in that case, the right lines near the border of the picture will appear bent in the mirror, which will have a disagreeable effect, and cannot be avoided.

IX. The rays of a luminous body placed in the focus of a concave mirror being reflected in parallel lines, if a second mirror be placed diametrically opposite the first, it will, by collecting those rays in its focus, set fire to a combustible body.

13
IX. To set fire to a combustible body by the reflection of two concave mirrors.

Place two concave mirrors, A and B (fig. 8.) at about twelve or fifteen feet distance from each other, and let the axis of each of them be in the same line. In the focus C, of one of them, place a live coal, and

in

* That is, half-way between a line drawn perpendicular to the ground and its surface.

in the focus D of the other, some gun-powder. With a pair of double bellows, which make a continual blast, keep constantly blowing the coal, and notwithstanding the distance between them the powder will presently take fire.

It is not necessary that these mirrors be of metal or brass, those made of wood or pasteboard, gilded, will produce the explosion, which has sometimes taken effect at the distance of fifty feet, when mirrors of eighteen inches, or two feet diameter, have been used.

This experiment succeeds with more difficulty at great distances; which may proceed from the moisture in a large quantity of air. It would doubtless take effect more readily, if a tin tube, of an equal diameter with the mirrors, were to be placed between them.

14
The real ap-
portion, fig. 9.

X. Behind the partition AB, place, in a position something oblique, the concave mirror EF, which must be at least ten inches in diameter, and its distance from the partition equal to three-fourths of the distance of its center.

In the partition make an opening of seven or eight inches, either square or circular: it must face the mirror, and be of the same height with it. Behind this partition place a strong light, so disposed that it may not be seen at the opening, and may illumine an object placed at C, without throwing any light on the mirror.

Beneath the aperture in the partition place the object C, that you intend shall appear on the outside of the partition, in an inverted position; and which we will suppose to be a flower. Before the partition, and beneath the aperture, place a little flower-pot D, the top of which should be even with the bottom of the aperture, that the eye, placed at G, may see the flower in the same position as if its stalk came out of the pot.

Take care to paint the space between the back part of the partition and the mirror black, to prevent any

reflections of light from being thrown on the mirror; in a word, so dispose the whole that it may be as little enlightened as possible.

When a person is placed at the point G, he will perceive the flower that is behind the partition, at the top of the pot at D, but on putting out his hand to pluck it, he will find that he attempts to grasp a shadow.

The phenomena that may be produced by means of concave mirrors are highly curious and astonishing. By their aid, spectres of various kinds may be exhibited. Suppose, for example, you were to tell any one, that at such an hour, and in such a place, he should see the apparition of an absent or deceased friend (of whose portrait you are in possession). In order to produce this phantom, instead of the hole in the partition AB, in the last figure, there must be a door, which opens into an apartment to which there is a considerable descent. Under that door you are to place the portrait, which must be inverted and strongly illuminated, that it may be lively reflected by the mirror, which must be large and well polished. Then having introduced the incredulous spectator at another door, and placed him in the proper point of view, you suddenly throw open the door at AB, when, to his great astonishment, he will immediately see the apparition of his friend.

It will be objected, perhaps, that this is not a perfect apparition, because it is only visible at one point of view, and by one person. But it should be remembered, that it was an established maxim in the last centuries, that a spectre might be visible to one person and not to others. So Shakspeare makes both Hamlet and Macbeth see apparitions that were not visible to others, present at the same time. It is not unlikely, moreover, that this maxim took its rise from certain apparitions of this kind that were raised by the monks, to serve some purposes they called religious: as they alone were in possession of what little learning there then was in the world.

C A T

CATOPTROMANCY, *Κατοπτρομαντεία*, a kind of divination among the ancients; so called, because consisting in the application of a mirror. The word is formed from *κατοπτρον*, *speculum*, "mirror," and *μαντεία*, *divinatio*, "divination." Pausanias says, it was in use among the Achæians; where those who were sick, and in danger of death, let down a mirror, or looking-glass, fastened by a thread, into a fountain before the temple of Ceres; then, looking in the glass, if they saw a ghastly disfigured face, they took it as a sure sign of death: on the contrary, if the flesh appeared fresh and healthy, it was a token of recovery. Sometimes glasses were used without water, and the images of things future represented in them. See GASTROMANCY.

CATROU (Francis), a famous Jesuit born at Paris in 1659. He was engaged for twelve years in the *Journal de Trevoux*, and applied himself at the same time to other works, which distinguished him among the learned. He wrote a general History of the Mogul empire, and a Roman history, in which he was

C A T

assisted by Father Rouille a brother Jesuit. Catrou died in 1737; and this last history was continued by Rouille, who died in 1740.

CATTI, a people of Germany, very widely spread; on the east reaching to the river Sala, on the north to Westphalia; occupying, besides, Hesse, the Wetterau, and part of the tract on the Rhine, and on the banks of the river Lohne. The Herzynian forest began and ended in their country.

CATTLE, a collective word, which signifies the fourfooted animals, which serve either for tilling the ground, or for food to men. They are distinguished into large, or black cattle; and into small cattle: of the former are horses, bulls, oxen, cows, and even calves and heifers; amongst the latter are rams, ewes, sheep, lambs, goats, kids, &c. Cattle are the chief stock of a farm: they who deal in cattle are styled graziers.

CATTERTHUN, a remarkable Caledonian post, a few miles north of the town of Brechin in the county of Angus in Scotland. Mr Pennant describes it as uncommon

Catullus | **Catz.** uncommon strength. "It is (says he) of an oval form, made of a lustrous dike of loose white stones, whose convexity, from the bafe within to that without, is 122 feet. On the outside a hollow, made by the disposition of the stones, furrounds the whole. Round the bafe is a deep ditch, and below that about 100 yards, are vetiges of another, that went round the hill. The area within the stony mound is flat; the axis, or length of the oval, is 436 feet, the transverse diameter 200. Near the east side is the foundation of a rectangular building; and on most parts are the foundations of others small and circular: all which had once their superstructures, the flicker of the possessors of the post: there is also a hollow, now almost filled with stones, the well of the place." There is another fortification, but of inferior strength, in the neighbourhood. It is called the *Brown Catterthun*, from the colour of the ramparts which are composed only of earth. It is of a circular form, and consists of various concentric dikes. On one side of this rises a small rill, which, running down the hill, has formed a deep gully. From the side of the fortrefs is another rampart, which extends parallel to the rill, and then reverts, forming an additional post or retreat. The meaning of the word *Catter-thun* is *Camp-town*; and Mr Pennant thinks these might probably be the posts occupied by the Caledonians before their engagement at the foot of the Grampian Mountains with the celebrated Agricola. See (*History of*) SCOTLAND.

CATULLUS (Caius Valerius), a Latin poet, born at Verona, in the year of Rome 666. The harmony of his numbers acquired him the esteem and friendship of Cicero, and other great men of his time. Many of his poems, however, abound with gross obscenities. He wrote satirical verses against Cæsar, under the name of Marmoro. He spent his whole life in a state of poverty; and died in the flower of his age, and the height of his reputation. Joseph Scaliger, Pafferat, Muret, and Isaac Vossius, have written learned notes on this poet.

CATZ (James), a great civilian, politician, and Dutch poet, was born at Brouwerhaven, in Zealand, in the year 1577. After having made several voyages, he fixed at Middleburg; and acquired by his pleadings such reputation, that the city of Dort chose him for its peniary; as did also, some time after, that of Middleburg. In 1634, he was nominated peniary of Holland and West Friesland; and in 1648, he was elected keeper of the seal of the same state, and stadtholder of the sicks: but some time after, he resigned these employments, to enjoy the repose which his advanced age demanded. As the post of grand peniary had been fatal to almost all those who had enjoyed it, from the beginning of the republic till that time, Catz delivered up his charge on his knees, before the whole assembly of the states, weeping for joy, and thanking God for having preserved him from the inconveniences that seemed attached to the duties of that office. But though he was resolved to spend the rest of his days in repose, the love of his country engaged him to comply with the desires of the state, who importuned him to go on an embassy to England, in the delicate conjuncture in which the republic found itself during the protectorate of Cromwell. At his

return, he retired to his fine country seat at Sorgvliet, where he lived in tranquillity till the year 1660, in which he died. He wrote a great number of poems in Dutch; most of which are on moral subjects, and so esteemed, that they have been often printed in all the different sizes; and next to the Bible, there is no work so highly valued by the Dutch.

CATZENELLIBOGEN, a town of Germany, in the lower part of the upper circle of the Rhine, with a strong castle. It is capital of a county of the same name. E. Long. 7. 38. N. Lat. 50. 20.

CAVA, a considerable and populous town of Italy, in the kingdom of Naples, and in the Hither Principato, with a bishop's see. It is situated at the foot of Mount Metelian, in E. Long. 15. 5. N. Lat. 40. 40.

CAVAILLAN, a town of France in Contal Venaisin, with a bishop's see. It is situated on the river Durance, in a fertile and pleasant country. E. Long. 4. 17. N. Lat. 43. 52.

CAVALCANTE (Guido), a nobleman of Florence in the 13th century, who having followed the party of the Guelphs, experienced the changeableness of fortune. He shewed great strength of mind in his misfortunes, and never neglected to improve his talents. He wrote a treatise in Italian concerning style, and some verses which are esteemed. His poem on the love of this World, has been commented on by several learned men.

CAVALIER, a horseman, or person mounted on horseback; especially if he be armed withal, and have a military appearance.

Anciently, the word was restrained to a knight, or *miles*. The French still use *Chevalier* in the same sense.

CAVALIER, considered as a faction. See BRITAIN, n° 109.

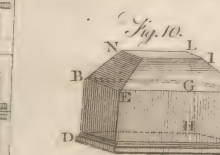
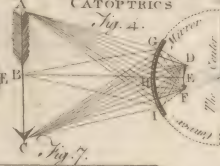
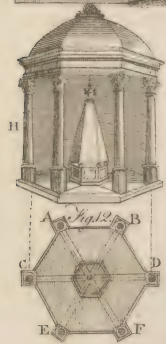
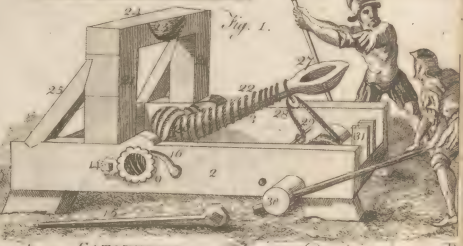
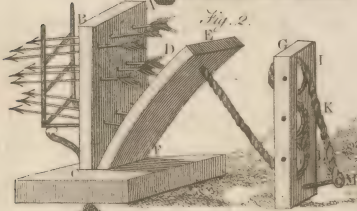
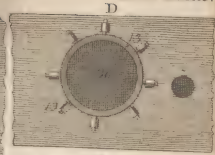
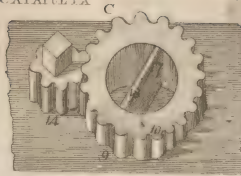
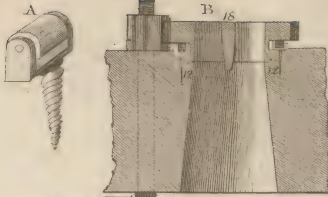
CAVALIER, in fortification, an elevation of earth of different shapes, situated ordinarily in the gorge of a bastion, bordered with a parapet, and cut into more or less embrasures, according to the capacity of the cavalier. Cavaliers are a double defence for the faces of the opposite bastion: they defend the ditch, break the besiegers galleries, command the traverses in dry moats, scour the salient angle of the counterescarp, where the besiegers have their counter-batteries, and enfilade the enemies trenches, or oblige them to multiply their parallels: they are likewise very serviceable in defending the breach and the retrenchments of the besieged, and can very much incommode the entrenchments which the enemy make, being lodged in the bastion.

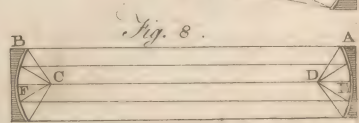
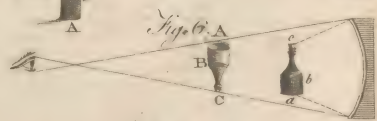
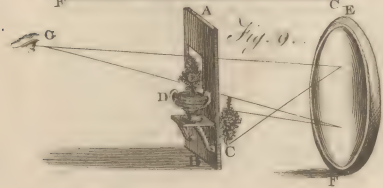
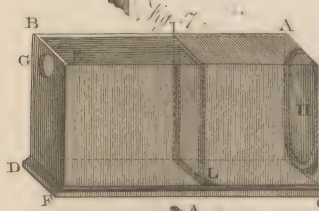
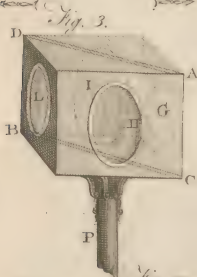
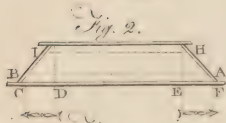
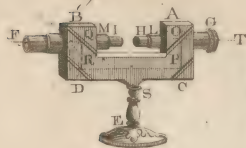
CAVALIER, in the menage, one that understands horses, and is practised in the art of riding them.

CAVALIERI (Bonaventure), an eminent mathematician in the 17th century, a native of Milan, and a friar of the order of the Jesuits of St Jerome, was professor of mathematics at Bologna, where he published several mathematical books, particularly the *Method of Indivisibles*. He was a scholar of Galileo. His *Directorium generale Uranometricum* contains great variety of most useful practices in trigonometry and astronomy. His trigonometrical tables in that work are excellent.

CAVALRY, a body of soldiers that charge on horseback. The word comes from the French, *cavalerie*,

Catzenelli-
bogen
|
Cavalry.







Cavan
I
Caucasus.

valerie, and that from the corrupt Latin, *caballus*, a horse.

The Roman cavalry consisted wholly of those called *equites*, or knights, who were a distinct order in the distribution of citizens.—The Grecian cavalry were divided into *cataphractæ* and *non cataphractæ*, i. e. into heavy and light armed.—Of all the Greeks, the Thebians excelled most in cavalry. The Lacedæmonians, inhabiting a mountainous country, were but meanly furnished with cavalry, till, carrying their arms into other countries, they found great occasion for horses to support and cover their foot. The Athenian cavalry, for a considerable time, consisted only of 96 horsemen: after expelling the Persians out of Greece, they increased the number to 300; and afterwards to 1200, which was the highest pitch of the Athenian cavalry. The Turkish cavalry consists partly of Spahis, and partly of horsemen raised and maintained by the Zaims and Timariots.

The chief use of the cavalry is to make frequent excursions to disturb the enemy, intercept his convoys, and destroy the country: in battle to support and cover the foot, and to break through and disorder the enemy; also to secure the retreat of the foot. Formerly, the manner of the fighting of the cavalry was, after firing their pistols or carabines to wheel off, to give opportunity for loading again. Gustavus Adolphus is said to have first taught the cavalry to charge through, to march straight up to the enemy, with the sword drawn in the bridlehand, and each man having fired his piece, at the proper distance, to betake himself to his sword, and charge the enemy as was found most advantageous.

CAVAN, a town of Ireland, and capital of a county of the same name, in the province of Ulster, situated in W. Long. 7. 32. N. Lat. 5. 04.

CAVAN, a county of Ireland, 47 miles in length, and 23 in breadth; is bounded on the east by Monaghan, and on the south by Longford, West-Meath, and East-meath. It has but two towns of any note, viz. Cavan and Kilmore. It sends five members to parliament; two for the county, two for Cavan, and one for Kilmore. It contains upwards of 8000 houses, 37 parishes, seven baronies, and two boroughs.

CAUCASUS, the name of a very high mountain of Asia, being one of that great ridge which runs between the Black and Caspian seas. Sir John Chardin describes this as the highest mountain, and the most difficult to pass, of any he had seen. It has frightful precipices, and in many places the roads are cut out of the solid rock. At the time he passed it, the mountain was entirely covered with snow; so that, in many places, his guides behaved to clear the way with hoes. The mountain is 36 leagues over, and the summit of it eight leagues in breadth. The top is perpetually covered with snow; and our traveller relates, that the two last days he seemed to be in the clouds, and was not able to see 20 paces before him. Excepting the very top, however, all the parts of Mount Caucasus are extremely fruitful; abounding in honey, corn, fruits, hogs, and large cattle. The vines twine about the trees, and rise so high, that the inhabitants cannot gather the fruit from the uppermost branches. There are many streams of excellent water, and a

vast number of villages. The inhabitants are for the most part Christians of the Georgian Church. They have fine complexions, and the women are very beautiful.—In the winter they wear snow-shoes in the form of rackets, which prevent their sinking in the snow, and enable them to run upon it with great swiftness.

CAUCI. See CHAUCI.

CAUDEBEC, a rich, populous, and trading town in Normandy, and capital of the territory of Caux. It is seated at the foot of a mountain near the river Seine, in E. Long. o. 46. N. Lat. 40. 30.

CAUDEX, by Malpighi and other botanists, is used to signify the stem or trunk of a tree: by Linnæus, the stock or body of the root, part of which ascends, part descends. The ascending part raises itself gradually above ground, serving frequently for a trunk, and corresponds in some measure to the *caudex* of former writers: the descending part strikes gradually downward into the ground, and puts forth radicles or small fibres, which are the principal and essential part of every root*. The descending caudex therefore corresponds to the radix of other botanists. Agreeably to this idea, Linnæus considers trees and shrubs as roots above ground; an opinion which is confirmed by a well known fact, that trees when inverted, put forth leaves from the descending caudex, and radicles or roots from the ascending. For the varieties in the descending caudex, see the article RADIX.

CAVE, any large subterraneous hollow. These were undoubtedly the primitive habitations, before men began to build edifices above ground. The primitive method of burial was also to reposit the bodies in caves, which seems to have been the origin of catacombs*. They long continued the proper habitations of shepherds. Among the Romans, *cavæ*, (*antra*), used to be consecrated to nymphs, who were worshipped in caves, as other gods were in temples. The Persians also worshipped their god Mithras in a natural cave consecrated for the purpose by Zoroaster. The cave of the nymph Egeria is still shewn at Rome. Kircher, after Gaffarellos, enumerates divers species of caves; as divine, natural, &c.—Of natural caves some are possessed of a medicinal virtue, as the Grotto de Serpente; others are poisonous or metaphysical; some are replete with metalline exhalations, and others with waters. Divine caves were those said to affect the human mind and passions in various ways, and ever to inspire with a knowledge of future events. Such were the sacred caverns at Delphi which inspired the Pythia; the Sibyl's cave at Cumæ, still shewn near the lake Avernus; the cave of Trophœus, &c.

CAVE (Dr William), a learned English divine, born in 1637, educated in St John's college Cambridge; and successively minister of Hasely in Oxfordshire, Allhallows the Great in London, and of Ilfington. He became chaplain to Charles II. and in 1684 was installed a canon of Windsor. He compiled the *Lives of the Primitive Fathers in the three first centuries of the church*, which is esteemed a very useful work; and *Historia Literaria*, &c. in which he gives an exact account of all who had writ for or against Christianity,

Cauci
I
Cave.

* See Rad.
cul.

* See Cita.
comb.

Caveare
|
Cavendish.

anity, from the time of Christ to the 14th century: which works produced a warm controversy between Dr Cave and M. Le Clerc, who was then writing his *Bibliothèque Universelle* in Holland, and who charged the doctor with partiality. Dr Cave died in 1713.

CAVEARE, CAVEER, or CAVIARY, a kind of food lately introduced into Britain. It is made of the hard roes of flurgeon *, formed into small cakes, about an inch thick and three or four inches broad. The method of making it, is by taking out of the spawn all the nerves or strings, then washing it in white-wine or vinegar, and spreading it on a table. It is then salted and pressed in a fine bag; after which it is cased up in a vessel with a hole at the bottom, that if any moisture is left it may run out. This kind of food is in great request among the Moscovites, on account of their three lenis, which they keep with a superstitious exactness; wherefore the Italians settled at Moscow drive a very great trade in this commodity throughout that empire, there being a prodigious quantity of flurgeon taken at the mouth of the Wolga and other rivers which fall into the Caspian sea. A pretty large quantity of the commodity is also consumed in Italy and France. They get the caveare from Archangel, but commonly buy it at second hand of the English and Dutch.—According to Savary, the best caveare brought from Muscovy is prepared from the belluga, a fish eight or ten feet long, caught in the Caspian sea, which is much preferable to that made of the spawn of flurgeon. A kind of caveare, or rather sausage, is also made from the spawn of some other fishes; particularly of roe of mullet caught in the Mediterranean. See MUGIL, and BOTARGO.

CAVEAT, in law, a kind of process in the spiritual courts, to stop the proving of a will, the granting tithes of administration, &c. to the prejudice of another. It is also used to stop the institution of a clerk to a benefice.

CAVEATING, in fencing, is the shifting the sword from one side of that of your adversary to the other.

CAVEDO, in commerce, a Portuguese long measure, equal to 27 $\frac{3}{4}$ English inches.

CAVENDISH (Thomas), of Suffolk, the second Englishman that sailed round the globe, was descended from a noble family in Devonshire. Having dissipated his fortune, he resolved to repair it at the expense of the Spaniards. He sailed from Plymouth with two small ships in July 1586; passed through the straits of Magellan; took many rich prizes along the coasts of Chili and Peru; and near California possessed himself of the St Ann, an Acapulco ship, with a cargo of immense value. He completed the circumnavigation of the globe, by returning home round the Cape of Good Hope, and reached Plymouth again in September 1588. On his arrival, it is said, that his soldiers and sailors were clothed in silk, his sails were damask, and his topmasts were covered with cloth of gold. His acquired riches did not last long: he reduced himself, in 1591, to the expedient of another voyage; which was far from being so successful as the former; he went no farther than the straits of Magellan, where the weather obliging him to return, he died of grief on the coast of Brazil.

Cavendish.

CAVENDISH (Sir William), descended of an ancient and honourable family, was born about the year 1505, the second son of Thomas Cavendish, of Cavendish in Suffolk, clerk of the pipe in the reign of Henry VIII. Having had a liberal education, he was taken into the family of the great cardinal Woolley, whom he served in the capacity of gentleman-usher of the chamber, when that superb prelate maintained the dignity of a prince. In 1527 he attended his master on his splendid embassy to France, returned with him to England, and was one of the few who continued faithful to him in his disgrace. Mr Cavendish was with him when he died, and delayed going to court till he had performed the last duty of a faithful servant by seeing his body decently interred. The king was so far from disapproving of his conduct, that he immediately took him into his household, made him treasurer of his chamber, a privy counsellor, and afterwards conferred on him the order of knighthood. He was also appointed one of the commissioners for taking the surrender of religious houses. In 1540 he was nominated one of the auditors of the court of augmentations, and soon after obtained a grant of several considerable lordships in Hertfordshire. In the reign of Edward VI. his estates were much increased by royal grants in seven different counties; and he appears to have continued in high favour at court during the reign of queen Mary. He died in the year 1557. He was the founder of Chatworth, and ancestor of the dukes of Devonshire. He wrote "The life and death of cardinal Woolley;" printed at London 1667; reprinted in 1706, under the title of "Memoirs of the great favourite cardinal Woolley."

CAVENDISH (William), duke of Newcastle, grandson of Sir William Cavendish, was born in 1592. In 1610, he was made knight of the bath; in 1620, raised to the dignity of a peer, by the title of baron Ogle, and viscount Mansfield; and in the third year of king Charles I. created earl of Newcastle upon Tyne, and baron Cavendish of Boleover. He was after this made governor to the prince of Wales, afterwards Charles II. When the first troubles broke out in Scotland, and the king's treasury was but indifferently provided, he contributed ten thousand pounds; and also raised a troop of horse, consisting of about two hundred knights and gentlemen, who served at their own charge, were commanded by the earl, and honoured with the title of "the prince's troop." He had after this the command of the northern counties; and was constituted general and commander in chief of all the forces that might be raised north of Trent, and of several counties south of that river. He afterwards raised an army of eight thousand horse, foot, and dragoons; with which he took some towns, and gained several important victories. On this, he was advanced to the dignity of marquis of Newcastle; but his majesty's affairs being totally ruined by the rashness of prince Rupert, he, with a few of the principal officers of the army, went abroad, and staid for some time at Paris; where, notwithstanding the vast estate he had when the civil war broke out, his circumstances were now so bad, that himself and wife were reduced to the necessity of pawning their cloaths for a dinner. He afterwards removed to Antwerp, that

* See Acci-
perfer.

Cavendish, that he might be nearer his own country; and there, though under great difficulties, resided for several years: but, notwithstanding his distresses, he was treated, during an exile of eighteen years, with extraordinary marks of distinction. On his return to England at the restoration, he was advanced to the dignity of earl of Ogle and duke of Newcastle. He spent his time in a country retirement, and was the patron of men of merit. His grace died in 1679, aged 84. He wrote a treatise on horsemanship, which is esteemed; and some comedies, which are not.

Mr Granger observes, that he was master of many accomplishments, and was much better qualified for a court than a camp: that he understood horsemanship, music, and poetry; but was a better horseman than musician, and a better musician than poet.

CAVENDISH (Margaret), duchess of Newcastle, famous for her voluminous productions, was born about the latter end of the reign of James I. and was the youngest sister of Lord Lucas of Colchester. She married the duke of Newcastle abroad in 1645; and on their return after the restoration, spent the remainder of her life in writing plays, poems, with the life of her husband, to the amount of about a dozen of folios. "What gives the best idea of her unbounded passion for scribbling, (says Mr Walpole), was her seldom revising the copies of her works, lest, as she said, it should disturb her following conceptions." She died in 1673.

CAVENDISH (William), the first duke of Devonshire, and one of the most distinguished patriots in the British annals, was born in 1640. In 1677, being then member for Derby, he vigorously opposed the venal measures of the court; and, the following year, was one of the committee appointed to draw up articles of impeachment against the lord treasurer Danby. In 1679, being re-elected to serve for Derby in a new parliament, Charles II. thought fit to make him a privy counsellor; but he soon withdrew from the board, with his friend lord Russell, when he found that popish interest prevailed. He carried up the articles of impeachment to the house of lords, against lord chief justice Scroggs, for his arbitrary and illegal proceedings in the court of king's bench; and when the king declared his resolution not to sign the bill for excluding the Duke of York (afterwards James II.), he moved the house of commons, that a bill might be brought in for the association of all his majesty's protestant subjects. He also openly named the king's evil counsellors, and voted for an address to remove them from his presence and councils for ever. He nobly appeared at lord Russell's trial, in defence of that great man, at a time when it was scarce more criminal to be an accomplice than a witness for him. The same fortitude, activity, and love of his country, animated this illustrious patriot to oppose the arbitrary proceedings of James II.; and when he saw there was no other method of saving the nation from impending slavery, he was the foremost in the association for inviting over the prince of Orange, and the first nobleman who appeared in arms to receive him at his landing. His last public service, was in the union with Scotland, for concluding of which he was appointed a commissioner by queen Anne. He died in

1707, and ordered the following inscription to be put on his monument.

*Willielmus Dux Devon,
Bonorum Principum Fidelis Subditus,
Inimicus et Invidiosus Tyrannus.
William Duke of Devonshire,
Of good Princes the faithful Subject,
The Enemy and Averion of Tyrants.*

Besides being thus estimable for public virtues, his grace was distinguished by his literary accomplishments. He had a poetical genius, which flew itself particularly in two pieces, written with equal spirit, dignity, and delicacy: these are, an ode on the death of queen Mary; and an allusion to the archbishop of Cambray's supplement to Homer. He had great knowledge in the languages, was a true judge in history, and a critic in poetry; he had a fine hand in music, an elegant taste in painting, and in architecture had a skill equal to any person of the age in which he lived.

CAVETTO, in architecture, a hollow member, or round concave moulding, containing a quadrant of a circle, and having a quite contrary effect to that of a quarter round: it is used as an ornament in cornices.

CAVEZON, in the menage, a sort of nose-band, either of iron, leather, or wood, sometimes flat, and at other times hollow or twisted, clapt upon the nose of a horse to wring it, and so forward the suppling and breaking of the horse.

CAVIARE. See **CAVEARE**.

CAUK, or **CAWK**, a white, very dense substance, resembling spar, but not soluble in acids, though fusible by fire. It is generally found in or near lead mines. It hath a singular effect upon antimony in fusion. See **CHEMISTRY**, n° 453.

CAUKING, or **CAULKING**, of a Ship, is driving a quantity of oakum, or old ropes untwisted and drawn alunder, into the seams of the planks, or into the intervals where the planks are joined together in the ship's decks or sides, in order to prevent the entrance of water. After the oakum is driven very hard into these seams, it is covered with hot melted pitch or rosin, to keep the water from rotting it.

Among the ancients, the first who made use of pitch in caulking, were the inhabitants of Phœacia, afterwards called Corsica. Wax and rosin appear to have been commonly used previous to that period; and the Poles at this time use a sort of unctuous clay for the same purpose, on their navigable rivers.

CAULKING-Irons, are iron chisels for that purpose. Some of these irons are broad, some round, and others grooved. After the seams are stopped with oakum, it is done over with a mixture of tallow, pitch, and tar, as low as the ship draws water.

CAUL, in anatomy, a membrane in the abdomen, covering the greatest part of the guts; called, from its structure, *Reticulum*, but most frequently *Omentum*. See **ANATOMY**, n° 351.

CAUL is likewise a little membrane, found on some children, encompassing the head when born.

Drelncourt takes the *caul* to be only a fragment of the membranes of the fœtus; which ordinarily break at the birth of the child. Lampridius tells us, that the midwives fold this *caul* at a good price to the advocates and pleaders of his time; it being an opinion,

Cauliflowers

Causes.

that while they had this about them, they should carry with them a force of persuasion which no judge could withstand : the canons forbid the use of it ; because some witches and forcerers, it seems, had abused it.

CAULIFLOWERS, in gardening, a much esteemed species of cabbage. See **BRASSICA**.

CAURSINES, (*Caursini*), were Italians that came into England about the year 1235, terming themselves *the Pope's merchants*, but driving no other trade than letting out money ; and having great banks in England, they differed little from Jews, save (as history says) they were rather more merciful to their debtors. Some will have them called *Courseins*, quasi *Causa Ursini*, bearish and cruel in their causes; others *Caorsini* or *Corsini*, as coming from the isle of Corsica : but Cowel says, they have their name from *Caorsium*, *Caorfi*, a town in Lombardy, where they first practised their arts of usury and extortion ; from whence, spreading themselves, they carried their infamous trade through most parts of Europe, and were a common plague to every nation where they came. The then bishop of London excommunicated them ; and king Henry III. banished them from this kingdom in the year 1240. But, being the Pope's solicitors and money-changers, they were permitted to return in the year 1250 ; though in a very short time they were again driven out of the kingdom on account of their intolerable exactions.

CAUSA MATRIMONII PRÆLOCUTI, in common law, a writ that lies where a woman gives land to a man in fee to the intent he shall marry her, and he refuses to do it in a reasonable time, being thereunto required by the woman : and in such case, for not performing the condition, the entry of the woman into the lands again has been adjudged lawful.

The husband and wife may sue this writ against another who ought to have married her.

CAUSALITY, among metaphysicians, the action or power of a cause in producing its effect.

CAUSALTY, among miners, denotes the lighter, sulphureous, earthy parts of ores, carried off in the operation of washing. This, in the mines, they throw in heaps upon banks, which in six or seven years they find it worth their while to work over again.

CAUSE, that from whence any thing proceeds, or by virtue of which any thing is done : it stands opposed to effect. We get the ideas of cause and effect from our observation of the vicissitude of things, while we perceive some qualities or substances begin to exist, and that they receive their existence from the due application and operation of other beings. That which produces, is the cause ; and that which is produced, the effect : thus, fluidity in wax is the effect of a certain degree of heat, which we observe to be constantly produced by the application of such heat.

First CAUSE, that which acts of itself, and of its own proper power or virtue : God is the only first cause in this sense.

Second CAUSES are those which derive the power and faculty of action from a first cause.

Efficient CAUSES are the agents employed in the production of any thing.

Material CAUSES, the subjects whereon the agents work ; or the materials whereof the thing is produced.

Final CAUSES are the motives inducing an agent to act, or the design and purpose for which the thing was done.

Physical CAUSE, that which produces a sensible corporal effect ; as the sun is the physical cause of light.

Moral CAUSE, that which produces a real effect, but in things immaterial : as repentance is the cause of forgiveness. A moral cause is also defined, That which determines us, though not necessarily, to do, or not to do, any thing ; as advice, intreaties, commands, menaces, &c.

It is to be observed, that, in this sense, a moral cause is only applicable to a free intelligent agent : it is also observable, that the latter notion of a physical as well as a moral cause is the most just, clear, and distinct.

CAUSE, among civilians, the same with action. See **ACTION**.

CAUSE, among physicians. The cause of a disease is defined by Galen to be that during the presence of which we are ill, and which being removed the disorder immediately ceases. The doctrine of the causes of diseases is called **ÆTIOLOGY**.

Physicians divide causes into procaccatic, antecedent, and continent.

Procaccatic CAUSE, *αντια προκατακτιν*, called also *primitive* and *incipient cause*, is either an occasion which of its own nature does not beget a disease, but, happening on a body inclined to diseases, breeds a fever, gout, &c. (such as are watching, fasting, and the like) ; or an evident and manifest cause, which immediately produces the disease, as being sufficient thereto, such as is a sword in respect of a wound.

Antecedent CAUSE, *αντια προγονικη*, a latent disposition of the body, from whence some disease may arise ; such as a plethora in respect of a fever, a cachymia in respect of a scurvy.

Continent, Conjunct, or Proximate CAUSE, that principle in the body, which immediately adheres to the disease, and which being present, the disease is also present ; or, which being removed, the disease is taken away : such is the stone in a nephritic patient.

CAUSEWAY, or **CAUSEY**, a massive construction of stone, flakes, and fascines ; or an elevation of fat, viscons earth, well beaten ; serving either as a road in wet marshy places, or as a mole to retain the waters of a pond, or prevent a river from overflowing the lower grounds. See **ROAD**. The word comes from the French *Chaussee*, anciently wrote *Chaussee* ; and that from the Latin *Calceata*, or *Calcata* ; according to Somner and Spelman, *à calcando*. Bergier rather takes the word to have had its rise *à peditum calceis, quibus teruntur*. Some derive it from the Latin *calx*, or French *chaux*, as supposing it primarily to denote a way paved with chalk-stones.

CAUSEWAY, *calcetum*, or *calcea*, more usually denotes a common hard raised way, maintained and repaired with stones and rubbish.

Devil's CAUSEWAY, a famous work of this kind, which ranges through the county of Northumberland, commonly supposed to be Roman, though Mr Horley suspects it to be of later times.

Causes

Causeway.

Causeway
|
Causticity.

GIANT'S CAUSEWAY, is a denomination given to a huge pile of stony columns in the district of Coleraine in Ireland. See *GIANT'S Causeway*.

CAUSSIN (Nicholas), furnished the *Just*, a French Jesuit, was born at Troyes in Champagne, in the year 1580; and entered into the Jesuits order when he was 26 years of age. He taught rhetoric in several of their colleges, and afterwards began to preach, by which he gained very great reputation. He increased this reputation by publishing books, and in time was preferred to be confessor to the king. But he did not discharge this office to the satisfaction of Cardinal Richelieu, though he discharged it to the satisfaction of every honest man; and therefore, it is not to be wondered at, that he came at length to be removed. He died in the Jesuits convent at Paris in 1651. None of his works did him more honour than that which he entitled *Le Cour Sainte*. It has been printed a great many times, and translated into Latin, Italian, Spanish, Portuguese, German, and English. He published several other books both in Latin and French.

CAUSTICITY, a quality belonging to several substances, by the acrimony of which the parts of living animals may be corroded and destroyed. Bodies which have this quality, when taken internally, are true poisons. The causticity of some of these, as of arsenic, is so deadly, that even their external use is proscribed by prudent physicians. Several others, as nitrous acid, lapis infernalis or lunar caustic, common caustic, butter of antimony, are daily and successfully used to consume fungous flesh, to open ulcers, &c. They succeed very well when properly employed, and skilfully managed.

The causticity of bodies depends entirely on the state of the saline, and chiefly of the acid, matters they contain. When these acids happen to be at the same time much concentrated, and slightly attached to the matters with which they are combined, they are then capable of acting, and are corrosive or caustic. Thus fixed and volatile alkalies, although they are themselves caustic, become much more so by being treated with quick-lime; because this substance deprives them of much fat and inflammable matter, which binds and restrains the action of their saline principle. By this treatment, then, the saline principle is more disengaged, and rendered more capable of action. Also all combinations of metallic matters with acids form salts more or less corrosive, because these acids are deprived of all their superabundant water, and are besides but imperfectly saturated with the metallic matters. Nevertheless, some other circumstance is necessary to constitute the causticity of these saline metalline matters. For the same quantity of marine acid, which, when pure and diluted with a certain quantity of water, would be productive of no harm, shall, however, produce all the effects of a corrosive poison, when it is united with mercury in *corrosive sublimate*, although the sublimate shall be dissolved in so much water that its causticity cannot be attributed to the concentration of its acid. This effect is, by some chemists, attributed to the great weight of the metallic matters with which the acid is united: and this opinion is very probable, seeing its causticity is nothing but its

dissolving power, or its disposition to combine with other bodies; and this disposition is nothing else than attraction, which is one and the same thing as weight or gravitation.

CAUSTICS, in physic, an appellation given to medicines of so hot and fiery a nature, that, being applied, consume, and as it were burn, the texture of the parts, like hot iron.

Cautics are generally divided into four sorts; the common stronger caustic, the common milder caustic, the antimonial caustic, and the lunar caustic. See *PHARMACY*, n^o 649. 791; and *CHEMISTRY*, n^o 196.

CAUSTIC Curve, in the higher geometry, a curve formed by the concurrence or coincidence of the rays of light reflected from some other curve.

CAUSUS, or *BURNING FEVER*, a species of continual fever, accompanied with a remarkable inflammation of the blood.

CAUTERIZATION, the act of burning or searing some morbid part, by the application of fire either actual or potential. In some places they cauterize with burning tow, in others with cotton or moxa, in others with live coals; some use Spanish wax, others pyramidal pieces of linen, others gold or silver; Severinus recommends flame blown through a pipe; but what is usually preferred among us is a hot iron.

Cauterizing irons are of various figures; some flat, others round, some curved, &c. of all which we find draughts in Albucasis, Scultetus, Ferrara, and others. Sometimes a cautery is applied through a capsula, to prevent any terror from the sight of it. This method was invented by Placentinus, and is described by Scultetus. In the use of all cauteries, care is to be taken to defend the neighbouring parts, either by a lamina, defensive plaster, or lint moistened in oxyerate. Sometimes the hot iron is transmitted through a copper cannula, for the greater safety of the adjoining parts. The degrees and manners of cauterizing are varied according to the nature of the disease, and the part affected.

CAUTERY, in surgery, a medicine for burning, eating, or corroding any solid part of the body.

Cauteries are distinguished into two classes; actual and potential: by actual cauteries are understood red hot instruments, usually of iron; and by potential cauteries are understood certain kinds of corroding medicines. See *PHARMACY*, n^o 648.

CAUTION, in the civil and Scots law, denotes much the same with what, in the law of England, is called *BAIL*.

CAUTIONER, in Scots law, that person who becomes bound for another to the performance of any deed or obligation. As to the different kinds and effects of caution, see *LAW*, Part III. n^o cxxxv. 19.

CAWK. See *CAWK*.

CAXA, a little coin made of lead mixed with some scoria of copper, struck in China, but current chiefly at Bantam in the island of Java, and some of the neighbouring islands. See (the *Table* subjoined to) *MONEY*.

CAXAMALCA, the name of a town and district of Peru in South America, where there was a most sumptuous palace belonging to the Incas, and a magnificent temple dedicated to the sun.

CAXTON (William) a mercer of London, emi-

Cautics
|
Caxton.

Cayenne.

nent by the works he published, and for being *reputed* the first who introduced and practised the art of printing in England: as to which, see (*the History of*) PRINTING.

CAYENNE, a rich town and island of South America, and capital of the French settlements there, is bounded on the north by the Dutch colonies of Surinam, and situated in W. Long. 53. 10. N. Lat. 50.

This settlement was begun in 1635. A report had prevailed for some time before, that, in the interior parts of Guiana, there was a country known by the name of *del Dorado*, which contained immense riches in gold and precious stones; more than ever Cortez and Pizarro had found in Mexico and Peru; and this fable had fired the imagination of every nation in Europe. It is supposed that this was the country in quest of which Sir Walter Raleigh went on his last voyage; and, as the French were not behind their neighbours in their endeavours to find out so desirable a country, some attempts, for this purpose, were likewise made by that nation much about the same time; which at last coming to nothing, the adventurers took up their residence on the island of Cayenne. In 1643, some merchants of Rouen united their stock, with a design to support the new colony; but, committing their affairs to one Poncet de Bretigny, a man of a ferocious disposition, he declared war both against the colonists and savages, in consequence of which he was soon massacred. This catastrophe entirely extinguished the ardour of these associates; and in 1651 a new company was established. This promised to be much more considerable than the former; and they set out with such a capital as enabled them to collect 700 or 800 colonists in the city of Paris itself. These embarked on the Seine, in order to fall down to Havre de Grace; but unfortunately, the Abbé de Marivault, a man of great virtue, and the principal promoter of the undertaking, was drowned as he was stepping into his boat. Another gentleman, who was to have acted as general, was assassinated on his passage; and 12 of the principal adventurers, who had promised to put the colony into a flourishing situation, not only were the principal perpetrators of this fact, but uniformly behaved in the same atrocious manner. At last they hanged one of their own number; two died; three were banished to a desert island; and the rest abandoned themselves to every kind of excess. The commandant of the citadel deserted to the Dutch with part of his garrison. The savages, roused by numberless provocations, fell upon the remainder, so that the few who were left thought themselves happy in escaping to the Leeward Islands in a boat and two canoes, abandoning the fort, ammunition, arms, and merchandise, fifteen months after they had landed on the island.

In 1663, a new company was formed, whose capital amounted only to L. 8750. By the assistance of the ministry they expelled the Dutch, who had taken possession of the island, and settled themselves much more comfortably than their predecessors. In 1667 the island was taken by the English, and in 1676 by the Dutch; but afterwards restored to the French; and since that time it has never been attacked. Soon after some pirates, laden with the spoils they

had gathered in the South Seas, came and fixed their residence at Cayenne; refusing to employ the treasures they had acquired in the cultivation of the lands. In 1688, Ducasse, an able seaman, arrived with some ships from France, and propoed to them the plundering of Surinam. This proposal exciting their natural turn for plunder, the pirates betook themselves to their old trade, and almost all the rest followed their example. The expedition, however, proved unfortunate. Many of the assailants were killed, and all the rest taken prisoners and sent to the Caribbee Islands. This loss the colony has never yet recovered.

The island of Cayenne is about 16 leagues in circumference, and is only parted from the continent by two rivers. By a particular formation, uncommon in islands, the land is highest near the water side, and low in the middle. Hence the land is so full of morasses, that all communication between the different parts of it is impossible, without taking a great circuit. There are some small tracts of an excellent soil to be found here and there; but the generality is dry, sandy, and soon exhausted. The only town in the colony is defended by a covert way, a large ditch, a very good mud rampart, and five battions. In the middle of the town is a pretty considerable eminence, of which a redoubt has been made that is called the *fort*. The entrance into the harbour is through a narrow channel; and ships can only get in at high water through the rocks and reefs that are scattered about this pass.

The first produce of Cayenne was the arnotto; from the produce of which, the colonists proceeded to that of cotton, indigo, and lastly sugar. It was the first of all the French colonies that attempted to cultivate coffee. The coffee-tree was brought from Surinam in 1721, by some deserters from Cayenne, who purchased their pardon by so doing. Ten or twelve years after, they planted cocoa. In the year 1752, there were exported from Cayenne, 260,541 pounds of arnotto, 80,363 pounds of sugar, 17,919 pounds of cotton, 26,881 pounds of coffee, 91,916 pounds of cocoa, 618 trees for timber, and 104 planks.

CAYLUS (Count de), Marquis de Sternay, Baron de Branae, was born at Paris in 1692. He was the eldest of the two sons of John Count de Caylus, lieutenant-general of the armies of the king of France, and of the Marchioness de Villete. The count and countess, his father and mother, were very careful of the education of their son. The former instructed him in the profession of arms, and in bodily exercises: the latter watched over and fostered the virtues of his mind; and this delicate task she discharged with singular success. The countess was the niece of Madam de Maintenon, and was remarkable both for the solidity of her understanding and the charms of her wit. She was the author of that agreeable book intitled, "The Recollections of Madam de Caylus," of which Voltaire lately published an elegant edition. The amiable qualities of the mother appeared in the son; but they appeared with a bold and military air. In his natural temper he was gay and sprightly, had a taste for pleasure, a strong passion for independence, and an invincible aversion to the servitude of a court. Such were the instructors of the

Count

Cayenne
Caylus.

Count de Caylus. He was only twelve years of age when his father died at Brussels in 1704. After finishing his exercises, he entered into the corps of the *Mousquetaires*; and in his first campaign in the year 1709, he distinguished himself by his valour in such a manner, that Lewis XIV. commended him before all the court, and rewarded him with an ensigncy in the *Gendarmes*. In 1711 he commanded a regiment of dragoons, which was called by his own name; and he signalized himself at the head of it in Catalonia. In 1713, he was at the siege of Frébourg, where he was exposed to imminent danger in the bloody attack of the covered way. The peace of Rastade having left him in a state of inactivity ill-suited to his natural temper, his vivacity soon carried him to travel into Italy; and his curiosity was greatly excited by the wonders of that country, where antiquity is still fruitful, and produces so many objects to improve taste and to excite admiration. The eyes of the count were not yet learned; but he was struck with the sight of so many beauties, and soon became acquainted with them. After a year's absence, he returned to Paris with so strong a passion for travelling, and for antiquities, as induced him to quit the army.

He had no sooner quitted the service of Lewis, than he sought for an opportunity to set out for the Levant. When he arrived at Smyrna, he visited the ruins of Ephesus. From the Levant he was recalled in February 1717 by the tenderness of his mother. From that time he left not France, but to make two excursions to London. The academy of painting and sculpture adopted him as an honorary member in the year 1731; and the count, who loved to realize titles, spared neither his labour, nor his credit, nor his fortune, to instruct, assist, and animate the artists. He wrote the lives of the most celebrated painters and engravers that have done honour to this illustrious academy; and, in order to extend the limits of the art, which seemed to him to move in too narrow a circle, he collected, in three different works, new subjects for the painter, which he had met with in the works of the ancients.

Such was his passion for antiquity, that he wished to have had it in his power to bring the whole of it to life again. He saw with regret, that the works of the ancient painters, which have been discovered in our times, are effaced and destroyed almost as soon as they are drawn from the subterraneous mansions where they were buried. A fortunate accident furnished him with the means of shewing us the composition and the colouring of the pictures of ancient Rome. The coloured drawings which the famous Pietro Sante Bartoli had taken there from antique pictures, fell into his hands. He had them engraved; and, before he enriched the king of France's cabinet with them, he gave an edition of them at his own expense. It is perhaps the most extraordinary book of antiquities that ever will appear. The whole is painted with a purity and a precision that are inimitable: we see the liveliness and the freshness of the colouring that charmed the Cæsars. There were only 30 copies published; and there is no reason to expect that there will hereafter be any more.

Count de Caylus was engaged at the same time in

an enterprize still more favourable to Roman grandeur, and more interesting to the French nation. Colbert had framed the design of engraving the Roman antiquities that are still to be seen in the southern provinces of France. By his orders Mignard the architect had made drawings of them, which Count de Caylus had the good fortune to recover. He resolved to finish the work begun by Colbert, and to dedicate it to that great minister; and so much had he this enterprize at heart, that he was employed in it during his last illness, and warmly recommended it to M. Mariette.

In 1742, Count Caylus was admitted honorary member of the academy of belles lettres; and then it was that he seemed to have found the place for which nature designed him. The study of literature now became his ruling passion; he consecrated to it his time and his fortune; he even renounced his pleasures to give himself wholly up to that of making some discovery in the field of antiquity. But amidst the fruits of his research and invention, nothing seemed more flattering to him than his discovery of encaustic painting. A description of Pliny's, but too concise a one to give him a clear view of the matter, suggested the idea of it. He availed himself of the friendship and skill of M. Magault, a physician in Paris, and an excellent chemist; and by repeated experiments found out the secret of incorporating wax with divers tints and colours, and of making it obedient to the pencil. Pliny has made mention of two kinds of encaustic painting practised by the ancients; one of which was performed with wax, and the other upon ivory, with hot punches of iron. It was the former that Count Caylus had the merit of reviving; and M. Muntz afterwards made many experiments to carry it to perfection.

In the hands of Count Caylus, literature and the arts lent each other a mutual aid. But it would be endless to give an account of all his works. He published above 40 dissertations in the memoirs of the academy of belles lettres. The artists he was particularly attentive to; and to prevent their falling into mistakes from an ignorance of costume, which the ablest of them have sometimes done, he founded a prize of 500 livres, the object of which is to explain, by means of authors and monuments, the usages of ancient nations. In order that he might enjoy with the whole world the treasures he had collected, he caused them to be engraved, and gave a learned description of them in a work which he embellished with 800 copperplates.

The strength of his constitution seemed to give him hopes of a long life: but a humour settling in one of his legs, which entirely destroyed his health, he expired on the 5th of September 1765, and by his death his family is extinct. The tomb erected to the honour of Count Caylus is to be seen in the chapel of St Germain-l'Auxerrois, and deserves to be remarked. It is perfectly the tomb of an antiquary. This monument was an ancient sepulchral antique, of the most beautiful porphyry, with ornaments in the Egyptian taste. From the moment he procured it, he had destined it to grace the place of his interment. While he availed the fatal hour, he placed it in his garden,

garden, where he used to look upon it with a tranquil but thoughtful eye, and pointed it out to the inspection of his friends.

The character of Count Caylus is to be traced in the different occupations which divided his cares and his life. In society, he had all the frankness of a soldier, and a politeness which had nothing in it of deceit or circumvention. Born independent, he applied to studies which suited his taste. His heart was yet better than his abilities. In his walks he used frequently to try the honesty of the poor, by sending them with a piece of money to get change for him. In these cases, he enjoyed their confusion at not finding him; and then presenting himself, used to commend their honesty, and give them double the sum. He said frequently to his friends, "I have this day lost a crown; but I was sorry that I had not an opportunity of giving a second. The beggar ought not to want integrity."

CAZEROM, or CAZERON, a city of Asia in Persia, situated in E. Long. 70. N. Lat. 29. 15.

CAZIC, or CAZIQUE, a title given by the Spaniards to the petty kings, princes, and chiefs, of the several countries of America, excepting those of Peru, which are called *curacas*. The French call them *caïques*, a denomination which they always give to the Tartarian hords.—The cazics, in some places, do the office of physicians, and in others of priests, as well as of captains. The dignity of cazic among the Chittes, a people of South America, does not descend to children, but must be acquired by valour and merit. One of the prerogatives annexed to it is, that the cazic may have three wives, while the other people are allowed only one. Mexico comprehended a great number of provinces and islands, which were governed by lords called *caziques*, dependent on and tributary to the emperor. Thirty of these vassals are said to have been so powerful, that they were able, each of them, to bring an army of 100,000 men into the field.

CAZIMIR, a handsome town of Poland, in the palatinate of Lublin, situated on a hill covered with trees, in E. Long. 3. 10. N. Lat. 51. 5.

CEANOTHUS, NEW-JERSEY TEA; a genus of the monogynia order, belonging to the pentandria class of plants. There are three species, of which the most remarkable is the Americanus, a native of most parts of North America, from whence great plenty of the seeds have been imported into Europe. In England, this plant seldom rises more than four or five feet high, sending out branches on every side from the ground upward. They are garnished with oval pointed leaves, having three longitudinal veins running from the footstalk to the point. The leaves are placed opposite, and are of a light green colour. At the extremity of each shoot, the flowers are produced in close thick spikes, which are composed of five small leaves, and are of a clear white; and every shoot is terminated by one of these spikes, so that the whole shoot is covered over with flowers. When the autumn proves mild, these shrubs often flower again in October. In warm seasons, the seeds will ripen pretty well in England. But the shrub is best propagated by laying down the young branches, which, in a light soil, will put

out roots in a year's time; but they must not be much watered, otherwise they will rot.

CEBES, of Thebes, a celebrated Socratic philosopher, author of the admired *Table of Cebes*; or "Dialogues on the life, birth, and death of Mankind." He flourished about 405 years before Christ.

CECIL (William), Lord Burleigh, treasurer of England in the reign of queen Elizabeth, was the son of Richard Cecil, Esq; master of the robes to king Henry VIII. He was born in the house of his grandfather, David Cecil, Esq; at Bourn in Lincolnshire, in the year 1520; and received the rudiments of his education in the grammar-school at Grantham. From thence he was removed to Stamford; and about the year 1535, was entered of St John's College, Cambridge. Here he began his studies with a degree of enthusiastic application very uncommon in young gentlemen of family. At the age of 16 he read a sophistry lecture, and at 19 a voluntary Greek lecture, which was the more extraordinary as being at a time when the Greek language was by no means universally understood. In 1541 he went to London, and became a member of the society of Gray's-Inn, with an intention to study the law; but he had not been long in that situation, before an accident introduced him to king Henry, and gave a new bias to his pursuits. O'Neil, a famous Irish chief coming to court, had brought with him two Irish chaplains, violent bigots to the Romish faith; with these Mr Cecil, visiting his father, happened to have a warm dispute in Latin, in which he displayed uncommon abilities. The king, being informed of it, ordered the young man into his presence, and was so pleased with his conversation, that he commanded his father to find a place for him. He accordingly requested the reversion of the *custos breuium*, which Mr Cecil afterwards possessed. About this time, he married the sister of Sir John Cheke, by whom he was recommended to the earl of Hertford, afterwards duke of Somerset and protector.

Soon after king Edward's accession, Mr Cecil came into the possession of his office of *custos breuium*, worth about L. 240 a-year. His first lady dying in 1543, he married the daughter of Sir Anthony Cook, director of the king's studies. In 1547, he was appointed by the protector, master of requests; and soon after, attended his noble patron on his expedition against the Scots, and was present at the battle of Musselburgh. In this battle, which was fought on the 10th of September 1547, Mr Cecil's life was miraculously preserved by a friend, who in pulling him out of the level of a cannon, had his arm shattered to pieces. The fight and judgement of his friend must have been as extraordinary as his friendship, to perceive the precise direction of a cannon shot; unless we suppose, that the ball was almost quite spent; in which case the thing is not impossible. The story is told in his life by a domestic. In the year 1548, Mr Cecil was made secretary of state; but in the following year, the duke of Northumberland's faction prevailing, he suffered in the disgrace of the protector Somerset, and was sent prisoner to the Tower. After three months confinement he was released; in 1551, restored to his office; and, soon after knighted, and sworn of the privy council. In 1553, he was made chancellor of the Order

Order of the Garter, with an annual fee of 100 marks.

On the death of Edward VI. Mr Cecil prudently refused to have any concern in Northumberland's attempt in favour of the unfortunate Lady Jane Grey; and, when queen Mary acceded to the throne, he was graciously received at Court; but, not chusing to change his religion, was dismissed from his employments. During this reign, he was twice elected knight of the shire for the county of Lincoln; and often spoke in the house of commons, with great freedom and firmness, in opposition to the ministry. Nevertheless, though a protestant and a patriot, (that is, a courtier out of place,) he had the address to steer through a very dangerous sea without shipwreck.

Queen Elizabeth's accession, in the year 1558, immediately dispelled the cloud which had obscured his fortunes and ministerial capacity. During the horrid reign of her sister, he had constantly corresponded with the prince of Elizabeth. On the very day of her accession, he presented her with a paper containing twelve articles necessary for her immediate dispatch; and, in a few days after, was sworn of the privy-council, and made secretary of state. His first advice to the queen was, to call a parliament; and the first business he proposed after it was assembled, was the establishment of a national church. A plan of reformation was accordingly drawn up under his immediate inspection, and the legal establishment of the Church of England was the consequence. Sir William Cecil's next important concern, was to restore the value of the coin, which had in the preceding reigns been considerably debased. In 1561, he was appointed master of the wards; and, in 1571, created baron of Burleigh, as a reward for his services, particularly in having lately stifled a formidable rebellion in the north. The following year he was honoured with the garter, and raised to the office of Lord High Treasurer of England. From this period we find him the *primum mobile* of every material transaction during the glorious reign of queen Elizabeth. Notwithstanding the temporary influence of other favourites, Lord Burleigh was, in fact, her prime minister, and the person in whom she chiefly confided in matters of real importance. Having filled the highest and most important offices of the state for 40 years, and guided the helm of government during the most glorious period of English history, he departed this life on the 4th of August 1598, in the 78th year of his age. His body was removed to Stamford, and there deposited in the family vault, where a magnificent tomb was erected to his memory.—Notwithstanding his long enjoyment of such lucrative employments, he left only an estate of L. 4000 *per annum*, L. 11,000 in money, and effects worth about L. 14,000. He lived, indeed, in a manner suitable to his high rank and importance. He had four places of residence, viz. his lodgings at court, his house in the Strand, his seat at Burleigh-Park near Stamford, and his seat at Theobalds. The last of these was his favourite place of retirement, where he frequently entertained the queen at a vast expence.

Lord Burleigh was doubtless a man of singular abilities and prudence; amiable in his private character, and one of the most able, upright, and indefatigable

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ministers ever recorded in the annals of this kingdom. His principal works are, 1. *La Complainte d' l'ame pecheuse*, or the Complaint of a sinful Soul, in French verse, in the king's library. 2. Materials for Patten's *Diarium exped. Scotice*, London 1541, 12^{mo}. 3. Slanders and lies maliciously, grossly, and impudently vomited out, in certain traitorous books and pamphlets, against two counsellors, Sir Francis Bacon, and Sir William Cecil. 4. A speech in parliament, 1562, Strype's Mem. vol. iv. p. 107. 5. Precepts or directions for the well ordering of a man's life, 1637, Harl. Cat. vol. ii. p. 755. 6. Meditations on the death of his lady, Ballard's Mem. p. 184. 7. Meditations on the state of England during the reign of queen Elizabeth, manuscript. 8. The execution of justice in England for the maintenance of public and Christian peace, &c. Lond. 1581, 1583, Somers's tracts, 4th collect. vol. i. p. 5. 9. Advice to queen Elizabeth in matters of religion and state, ib. p. 101. 16. 10. A great number of letters. See Peck's *Dejiderata Curiosa*; Howard's collections, &c. 11. Several pedigrees, some of which are preserved in the archbishop of Canterbury's library at Lambeth, n^o 299, 747.

CECILIA (St), the patroness of music, has been honoured as a martyr ever since the fifth century. Her story as delivered by the notaries of the Roman church, and from them transcribed into the Golden Legend and other books of the like kind, says, that she was a Roman lady born of noble parents, about the year 225. That, notwithstanding she had been converted to Christianity, her parents married her to a young pagan nobleman named Valerianus; who going to bed to her on the wedding night, *as the custom is*, says the book, was given to understand by his spouse, that she was nightly visited by an angel, and that he must forbear to approach her, otherwise the angel would destroy him. Valerianus, somewhat troubled at these words, desired that he might see his rival the angel; but his spouse told him that was impossible, unless he would consent to be baptized and become a Christian. This he consented to; after which, returning to his wife, he found her in her closet at prayer, and by her side, in the shape of a beautiful young man, the angel clothed with brightness. After some conversation with the angel, Valerianus told him that he had a brother named Tiburtius, whom he greatly wished to see a partaker of the grace which he himself had received. The angel told him that his desire was granted, and that they should be both crowned with martyrdom in a short time. Upon this the angel vanished, and was not long in shewing himself as good as his word; Tiburtius was converted, and both he and his brother Valerianus were beheaded. Cecilia was offered her life upon condition that she would sacrifice to the deities of the Romans; but she refused: upon which she was thrown into a caldron of boiling water, and scalded to death: others say that she was stifled in a dry bath, *i. e.* an inclosure, from whence the air was excluded, having a slow fire underneath it; which kind of death was sometimes inflicted by the Romans upon women of quality who were criminals. Upon the spot where her house stood, is a church said to have been built by pope Urban I. who administered baptism to her husband and his brother: it is the

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church

Cecrops
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Cedar.

church of St Cecilia at Trastevere; within is a most curious painting of the saint, as also a stately monument with a cumbent statue of her with her face downwards. There is a tradition of St Cecilia, that she excelled in music; and that the angel who was thus enamoured of her, was drawn from the celestial regions by the charms of her melody: this has been deemed authority sufficient for making her the patroness of music and musicians. The legend of St Cecilia has given frequent occasion to painters and sculptors to exercise their genius in representations of her, playing on the organ, and sometimes on the harp. Raphael has painted her fingering with a regal in her hands; and Domenichino and Mignard, fingering and playing on the harp.

CECROPS, the founder and first king of Athens, about the time of Moses the lawgiver of the Hebrews. He was the first who established civil government, religious rites, and marriage among the Greeks; and died after a reign of 50 years. See ATTICA, n° 4.

CEDAR, in botany. See CEDRUS, JUNIPERUS, and LARIX.

The species of cedar famous for its duration, is that popularly called by us the cedar of Lebanon*, by the ancients *cedrus magna*, or the great cedar; also *cedrelate*, *Kidpazan*; and sometimes the Phœnician, or Syrian cedar, from the country where it grows in its greatest perfection. It is a coniferous evergreen, of the bigger sort, bearing large roundish cones of smooth scales, standing erect, the leaves being small, narrow, and thick set.—They sometimes counterfeit cedar, by dying wood of a reddish hue: but the smell discovers the cheat, that of true cedar being very aromatic. In some places, the wood of the cajou tree passes under the name of cedar, on account of its reddish colour, and its aromatic smell, which somewhat resemble that of the cedar. Cedar wood is reputed almost immortal and incorruptible; a prerogative which it owes chiefly to its bitter taste, which the worms cannot endure. For this reason it was that the ancients used cedar tablets to write upon, especially for things of importance, as appears from that expression of Persius, *Et cedro digna locutus*. A juice was also drawn from cedar, with which they smeared their books and writings, or other matters, to preserve them from rotting; which is alluded to by Horace; by means of which it was, that Numa's books, written on papyrus, were preserved entire to the year 535, as we are informed by Pliny.

Solomon's temple, as well as his palace, were both of this wood. That prince gave king Hiram several cities for the cedars he had furnished him on these occasions. Cortes is said to have erected a palace at Mexico, in which were 7000 beams of cedar, most of them 120 feet long, and twelve in circumference, as we are informed by Herrera. Some tell us of a cedar felled in Cyprus 150 feet long, and 18 in diameter. It was used for the main mast in the galley of king Demetrius. Le Bruyn assures us, that the two biggest he saw on mount Lebanon, measured one of them 57 palms, and the other 47, in circumference. In the temple of Apollo at Utica, there were cedar trees near 2000 years old; which yet were nothing to that beam in an oratory of Diana at Seguntum in

Spain, said to have been brought thither 200 years before the destruction of Troy. Cedar is of a dry nature, that it will not endure to be fastened with iron nails, from which it usually shrinks, so that they commonly fasten it with pins of the same wood.

CEDRIA, a refinous liquor issuing from the great cedar tree, or cedar of Lebanon. The word is also written *cedrium*, and *cedrinum*.—Cedria, when good, yields a strong smell, is transparent, and of a thick fatty consistence; so that in pouring it out it does not fall too fast or freely, but equally, drop by drop. It is possessed of two opposite qualities, viz. to preserve dead bodies by its drying and consuming superfluous moisture without damaging the solid parts, and to putrefy the soft and tender parts of living bodies without exciting any pain. The cedria is properly the tear of the cedar; some call it the gum, others the pitch, of the cedar. The same denomination is also given to the *cedrelaon*, or oil of the cedars, which differs little from the resin, except that it is of a thinner consistence.

CEDRUS, the CEDAR-TREE of Barbadoes, and MAHOGANY, &c. As the cedar of Libanus is very properly referred by Linnaeus to the genus LARIX, and all the berry-bearing cedars to that of JUNIPERUS, Mr Miller hath chosen to treat this as a distinct genus; which, to avoid embarrassment from a long detail of different species, seems the most proper method.

Species. 1. The odorata, or Barbadoes cedar, is a native of the British islands in America, and is one of the largest trees to be found there. The wood has a fragrant odour, from whence the name of cedar has been given to it. It grows to the height of 70 or 80 feet: while young, the bark is smooth, and of an ash colour; but, as they advance, the bark becomes rough, and of a darker colour. Towards the top it sends out many side-branches, which are garnished with winged leaves, composed of 16 or 18 pair of lobes, and are sometimes near three feet long: the lobes are broad at their base, and near two inches long, blunt at their ends, and of a pale colour; these emit a very offensive odour in the summer-time. The fruit is oval, of the size of a partridge's egg, smooth, and of a dark colour, and opens in five parts, having a five-cornered column standing in the middle, between the angles of which the winged seeds are closely placed, lapsing over each other like the scales of fishes. 2. The mahogani, or mahogany-tree, is a native of the warmest parts of America; growing plentifully in the islands of Cuba, Jamaica, Hispaniola, and the Bahama islands. In Cuba and Jamaica there are mahogany trees of a very large size, so as to cut into planks of six feet breadth; but those of the Bahama islands commonly do not exceed four. They rise to a great height, though they are generally found growing upon solid rocks, where there is scarce any earth for their nourishment. The leaves of this tree are winged like the ash, having commonly six or eight pair of lobes, which are shorter and broader at the base than those of the ash, where they adhere by the midrib by very short foot-stalks: these lobes are very smooth, having but one vein running through each, which is always on one side, so as to divide them unequally. Mr Catesby has delineated both the flowers and

Cedria
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Cedrus.

Cedrus
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Celebes.

and fruit of this tree. The former cannot be depended on, as they were drawn from a withered imperfect fragment; but the fruit is very exact. The fruit before it opens is of a brown colour, growing erect upon long foot-stalks, which closely adhere to the five-cornered column running through the middle, and to which the seeds are fastened, lying *imbricatum* like the scales of a house. When the fruit is ripe, it divides at the bottom into five equal parts; and when these fall off, and the seeds are dispersed, the foot-stalk and the column remain some months after on the tree. 3. The *alternifolius* grows to the height of 80 feet or more. Towards the top it divides into many large branches, garnished with leaves somewhat resembling the witch-hazel; but broader at their base, and cut angular at their top: these are of an ash colour underneath, and set on the branches without any order: the fruit is much larger than that of the Barbadoes cedar, broad at the base, and diminishing gradually to the top, where it terminates in a point. This has also a woody column or core running lengthwise through the fruit, to which the winged seeds adhere as in the former.

Culture, &c. All these plants may be easily propagated by seeds; but, being natives of very warm climates, they must be planted in pots sheltered in a stove. The trunks of the first species are so large, that the inhabitants of those islands where they grow were wont to hollow them, and form them into the shape of boats and periaguas; for which purpose they are extremely well adapted: the wood being soft, may be cut with great facility; and being light, will carry a great load on the water. The wood is often used for waincotting rooms, and to make chests, because vermin do not so frequently breed in it as in other sorts of wood; this having a very bitter taste, which is communicated to whatever is put into the chests, especially while the wood is fresh; for which reason it is never made into casks, and the liquors put into them would dissolve part of the bitter resin. The uses of mahogany are so well known that it is needless to enumerate them. As for the wood of the third species, we have no accounts whether it is ever used in buildings or for other purposes.

CELANDINE, in botany. See CHELIDONIUM.

CELARENT, among logicians, a mode of syllogism, wherein the major and conclusion are universal negative propositions, and the minor an universal affirmative.

E. gr. *cE* None whose understanding is limited can be omniscient.

LA Every man's understanding is limited.

rEnt Therefore no man is omniscient.

CELASTRUS, the STAFF-TREE; a genus of the monogynia order, belonging to the pentandria class of plants. There are five species, all natives of warm climates. In Senegal the negroes use the powder of the root as a specific against gonorrhoeas, which it is said to cure in eight, or sometimes in three days. An infusion of the bark of a species of staff-tree, which grows in the isle of France, is said to possess the same virtues.

CELEBES, an island in the Indian sea, seated under the equator, and called by some *Macassar*. The

length and breadth has not been accurately computed; but the circumference, at a medium, is about eight hundred miles. It had formerly six kingdoms, which are reduced to one. The air is hot and moist; and subject to great rains during the north-west winds, which blow from November to March, at which time the country is overflowed, and for this reason they build their houses on piles of wood ten feet high. The most healthful time is during the northern monsoons, which seldom fail blowing regularly in one part of the year. The chief vegetables are rice and coconuts; but they have ebony, sanders, &c. Their fruits and flowers are much the same as in the neighbouring parts of the Indies. They have pepper, sugar, betel, areca, the finest cotton, and opium. The natives have bright olive complexions, and the women have shining black hair. They are thought to be very handsome by the Dutch and Chinese, who often purchase them for bedfellows. The men are industrious, robust, and make excellent soldiers. Their arms are sabres, and trunks, from whence they blow poisoned darts, which are pointed with the tooth of a sea-fish. Some likewise use poisoned daggers. They were the last of the Indian nations that were enslaved by the Dutch, which could not be effected till after a long war. They teach their children to read and write, and their characters have some resemblance of the Arabic. Their religion being Mahometan, the men indulge themselves in many wives and concubines. The employment of the women is spinning, cookery, and making their own and their husbands cloaths. The men wear jewels in their ears, and the women gold chains about their necks. The inhabitants in general go half naked, without any thing on their head, legs, or feet, and some have nothing but a cloth about their middle. The streets of the town Macassar are spacious, and planted with trees on every side. It stands by the side of the only large river they have in the island. The Dutch have a fort here, mounted with 40 guns, and garrisoned with 700 men. There is only one other town of note, called Jampandani, where they also have a fort. The island is not near so populous as when the Dutch conquered it; the men being hired for soldiers in most of the neighbouring countries.

The religion of these islands was formerly idolatry. They worshipped the sun and moon. They sacrificed to them in the public squares, having no materials which they thought valuable enough to be employed in raising temples. About two centuries ago, some Christians and Mahometans having brought their opinions to Celebes, the principal king of the country took a dislike to the national worship. Having convened a general assembly, he ascended an eminence, when, spreading out his hands towards heaven, he told the deity, that he would acknowledge for truth that doctrine whose ministers should first arrive in his dominions, and, as the winds and waves were at his command, the Almighty would have himself to blame if he embraced a falsehood. The assembly broke up, determined to wait the orders of heaven, and to obey the first missionaries that should arrive. The Mahometans were the most active, and their religion accordingly prevailed.

Celeres
|
Celibacy.

CCELERES, in Roman antiquity, a regiment of bodyguards belonging to the Roman kings, established by Romulus, and composed of 300 young men, chosen out of the most illustrious Roman families, and approved by the suffrages of the curiæ of the people, each of which furnished ten.

CCELERI, in botany, the English name of a species of *Arum*.

CCELERITY, in mechanics, the swiftness of any body in motion. It is also defined to be an affection of motion, by which any moveable body runs through a given space in a given time.

CELESTINS, a religious order so called from their founder Peter de Meuron, afterwards raised to the pontificate under the name of Celestin V. This Peter, who was born at Isernia, a little town in the kingdom of Naples, in the year 1215, of but mean parents, retired, while very young, to a solitary mountain, in order to dedicate himself wholly to prayer and mortification. The fame of his piety brought several, out of curiosity, to see him; some of whom, charmed with his virtues, renounced the world to accompany him in his solitude. With these he formed a kind of community in the year 1254; which was approved by pope Urban IV. in 1264, and erected into a distinct order, called the *hermits of St Damien*. Peter de Meuron governed this order till 1286, when his love of solitude and retirement induced him to quit the charge. In July 1294, the great reputation of his sanctity raised him, though much against his will, to the pontificate. He then took the name of Celestin V. and his order that of *Celestins* from him. By his bull he approved their constitutions, and confirmed all their monasteries to the number of 20. But he sat too short time in the chair of St Peter to do many great things for his order; for having governed the church five months and a few days, and considering the great burden he had taken upon him, to which he thought himself unequal, he solemnly renounced the pontificate in a consistory held at Naples.

After his death, which happened in 1296, his order made great progress not only in Italy, but in France likewise; whither the then general Peter of Tivoli sent twelve religious, at the request of king Philip the Fair, who gave them two monasteries; one in the forest of Orleans, and the other in the forest of Compeigne at mount Chartres. This order likewise passed into several provinces of Germany. They have about 96 convents in Italy, and 21 in France, under the title of priories.

The Celestins rise two hours after midnight, to say matins. They eat no flesh at any time, except when they are sick. They fast every Wednesday and Friday, from Easter to the feast of the exaltation of the holy cross; and, from that feast to Easter, every day. As to their habit, it consists of a white gown, a capuche, and a black scapulary. In the choir, and when they go out of the monastery, they wear a black cowl with the capuche: their shirts are of serge.

CELIBACY, the state of unmarried persons. Scaliger derives the word from the Greek *κατὰ*, "bed," and *λεγω*, *linguo*, "I leave:" others say it is formed from *celi beatitudo*; q. d. the blessedness of heaven.

The ancient Romans used all means imaginable to

Celibate.

dissuade celibacy. Nothing was more usual than for the censors to impose a fine on bachelors. Dionysius Halicarnassensis mentions an ancient constitution whereby all persons of full age were obliged to marry. But the first law of that kind, of which we have any certainty, is that under Augustus, called *lex Julia de maritandis ordinibus*. It was afterwards denominated *Papia Poppæa*, and more usually *Julia Papia*, in regard of some new function and amendments made to it under the consuls Papilius and Poppæus. By this law, divers prerogatives were given to persons who had many children; penalties imposed on those who lived a single life, as that they should be incapable of receiving legacies, and not exceeding a certain proportion.

CELIBATE, the same with celibacy; but it is chiefly used in speaking of the single life of the Popish clergy, or the obligation they are under to abstain from marriage. In this sense we say the law of *celibate*. Monks and religious take a vow of celibacy; and what is more, of chastity.

The church of Rome imposes an universal celibacy on all its clergy, from the pope to the lowest deacon and subdeacon. The advocates for this usage pretend, that a vow of perpetual celibacy was required in the ancient church as a condition of ordination, even from the earliest apostolic ages. But the contrary is evident from numerous examples of bishops and archbishops, who lived in a state of matrimony, without any prejudice to their ordination or their function. It is generally agreed that most of the apostles were married. Some say all of them, except St Paul and St John. Others say St Paul himself was married, because he writes to his *yoke-fellow*, whom they interpret his wife. Be this as it will, in the next ages after the apostles, we have accounts of divers married bishops, presbyters, and deacons, without any reproach or mark of dishonour set on them: e. g. Valens, presbyter of Philippi, mentioned by Polycarp; and Chæmon, bishop of Nilus. Novatus was a married presbyter of Carthage, as we learn from Cyprian; who himself was also a married man, as Pagi confesses; and so was Cæcilius the presbyter who converted him; and Nuniidius another presbyter of Carthage. The reply which the Romanists give to this, is, that all married persons, when they came to be ordained, promised to live separate from their wives by consent, which answered the vow of celibacy in other persons. But this is not only said without proof, but against it. For Novatus presbyter of Carthage, was certainly allowed to cohabit with his wife after ordination; as appears from the charge that Cyprian brings against him, that he had struck and abused his wife, and thereby caused her to miscarry. There seems indeed to have been, in some cases, a tendency towards the introduction of such a law, by one or two zealots; but the motion was no sooner made, than it was quashed by the authority of wiser men. Thus Eusebius observes, that Pinytus, bishop of Gnostus in Crete, was for laying the law of celibacy upon his brethren; but Dionysius bishop of Corinth wrote to him, that he should consider the weakness of men, and not impose that heavy burden on them. In the council of Nice, anno 325, the motion was renewed for a law to oblige the cler-

Celidographia
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Cell.

Cell
|
Celsia.

gy to abstain from all conjugal society with their wives, whom they had married before their ordination : but Paphnutius, a famous Egyptian bishop, and one who himself never was married, vigorously declaimed against it, upon which it was unanimously rejected. So Socrates and Sodomus tell the story ; to which all that Valefius, after Bellarmin, has to say, is, that he suspects the truth of it. The council in Trullo, held in 692, made a difference in this respect between bishops and presbyters ; allowing presbyters, deacons, and all the inferior orders, to cohabit with their wives after ordination ; and giving the Roman church a smart rebuke for the contrary prohibition, but at the same time laying an injunction upon bishops to live separate from their wives, and appointing the wives to betake themselves to a monastic life, or become deaconesses in the church. And thus was a total celibate established in the Greek church, as to bishops, but not any others. In the Latin church, the like establishment was also made, but by slow steps in many places. For in Africa, even bishops themselves cohabited with their wives at the time of the council of Trullo. The celibacy of the clergy, however, appears of an ancient standing, if not of command and necessity, yet as of counsel and choice. But as it is clearly neither of divine nor apostolical institution, it is, at first, hard to conceive from what motive the court of Rome persisted so very obstinately to impose this institution on the clergy. But we are to observe that this was a leading step to the execution of the project formed of making the clergy independent of princes, and rendering them a separate body to be governed by their own laws. In effect, while priests had children, it was very difficult to prevent their dependence on princes, whose favours have such an influence on private men ; but having no family, they were more at liberty to adhere to the Pope.

CELIDOGRAPHIA, the description of the spots which appear on the surfaces of the sun and planets. See ASTRONOMY, n^o 14—25, and 33—45.

CELL, CELLA, in ancient writers, denotes a place or apartment usually under ground, and vaulted, in which were stored up some sort of necessaries, as wine, honey, and the like ; and according to which it was called *Cella Vinaria*, *Olearia*, *Mellaria*, &c. The word is formed from the Latin *celare*, to conceal.

CELLA was also used for the lodge or habitation of a common prostitute, as being anciently under ground, hence also denominated *fovea*.

CELLA likewise signified the *adyte*, or inmost and most retired parts of temples, wherein the images of the gods to whom the edifices were consecrated were preserved. In this sense we meet with *cella Jovis*, *cella Concordiæ*, &c.

CELL is also used for a lesser or subordinate sort of ministry dependent on a great one, by which it was erected, and continues still to be governed. The great abbays in England had most of them *cells* in places distant from the mother abbey, to which they were accountable, and from which they received their superiors. The alien priories in England were cells to abbays in Normandy, France, Italy &c. The name *cell* was also given to rich and considerable monasteries not dependent on any other.

CELL signifies also a little apartment or chamber, such as those wherein the ancient monks, solitaries, and hermits, lived in retirement.

CELLS are also the little divisions in honey-combs, which are always regular hexagons *.

CELLS, in botany, the hollow places between the partitions in the pods, husks, and other seed-vessels of plants ; according as there is one, two, three, &c. of these cells, the vessel is said to be unilocular, bilocular, trilocular, &c.

CELLS, in anatomy, little bags, or bladders, where fluids or other matters are lodged ; called *loculi*, *cellulae*, &c.

CELLARIUS (Christopher) was born in 1638, at Smalcade in Franconia, of which town his father was minister. He was successively rector of the colleges at Weymar, Zeitz, and Meribourg ; and the king of Prussia having founded an university at Hall in 1693, he was prevailed on to be professor of eloquence and history there, where he composed the greatest part of his works. His great application to study hastened the infirmities of old age ; for it is said, he would spend whole days and nights together at his books, without any attention to his health, or even the calls of nature. His works relate to grammar, geography, history, and the oriental languages, and the number of them is amazing. He died in 1707.

CELLINI (Benvenuto), an eminent statuary, who was bred a jeweller and goldsmith, but seems to have had an extraordinary genius for the fine arts in general. He was cotemporary with Michael Angelo, and Julio Romano ; and was employed by popes, kings, and other princely patrons of sciences and arts, so highly cultivated in the days of Leo X. and Charles V. some of his productions being esteemed most exquisite. He lived to a very considerable old age ; and his life, almost to the last, was a continued scene of adventure, persecution, and misfortune, truly wonderful. He wrote his own history, which was not, however, published till the year 1730, probably on account of the excessive freedom with which he therein treated many distinguished personages of Italy and other countries. It was translated into English by Dr Nugent in 1771, to which the reader is referred, as it will not admit of an abridgement suitable to the design of this work.

CELLULAR, in a general sense, is applied to any thing consisting of single cells.

CELLULAR Membrane. See ANATOMY, n^o 82, et seq.

CELOSIA, COCKS-COMB ; a genus of the monogynia order, belonging to the pentandria class of plants. There are eight species, of which the most worthy of notice is the *crispata*, or common cocks-comb, so called on account of its crested head of flowers, resembling a cock's comb ; of these there are a great variety of species. The principal colours of their flowers are red, purple, yellow, and white ; but there are some whose heads are variegated with two or three colours. The heads are sometimes divided like a plume of feathers, and are of a beautiful scarlet colour. These plants are very tender exotics, and require a great deal of care to cultivate them in this country. Three hot-beds must be prepared ; a small

one

* See APIS, n^o 11. and Plate XXV. fig. 7, 8, 9.

Celsus.

one in March, on which to raise the plants an inch or two in height; a second in April, of larger dimensions, in which to transplant them when proper; and a third in May for a large frame, to receive them transplanted into pots, to remain till the end of June or beginning of July to grow to full size: all of which hot-beds must be covered with frames and glasses, and have five or six inches depth of fine rich light earth for the reception of the seed and plants; and in the second and third hot-bed, the frames must occasionally be raised or augmented, according as the plants shall rise in height.

CELSUS (Aurelius Cornelius), a celebrated physician of the first century, who wrote eight books on medicine, in elegant Latin. He was the Hippocrates of the Latins, and Quintilian gives him a high eulogium. The great Boerhaave tells us, that Celsus is one of the best authors of antiquity for letting us into the true meaning and opinions of Hippocrates; and that, without him, the writings of this father in physic would be often unintelligible, often misunderstood by us. He shews us also how the ancients cured distempers by friction, bathing, &c. His eight books of *Medicina* have been several times printed. The Elzivir edition, in the year 1650, by Vander Linden, is the best, as being entirely corrected from his manuscripts.

CELSUS, an epicurean philosopher in the second century. He wrote a work against the Christians, intitled, *The true Discourse*; to which Origen, at the desire of Ambrose his friend, wrote a learned answer. To this philosopher Lucian dedicated his *Pseudomantis*.

CELTE, or CELTES, an ancient nation, by which most of the countries of Europe are thought to have been peopled. The compilers of the Universal History are of opinion, that they are descended from Gomer the eldest son of Japhet, the son of Noah. They think that Gomer settled in the province of Phrygia in Asia: Ashkenaz his eldest son, or Togarmah his youngest, or both, in Armenia, and Riphath the second son in Cappadocia. When they spread themselves wider, they seem to have moved regularly in columns without interfering with or disturbing their neighbours. The descendants of Gomer, or the Celts, took the left hand, insensibly spreading themselves westward towards Poland, Hungary, Germany, France, and Spain; while the descendants of Magog, Gomer's brother, moving eastward, peopled Tartary.

In this large European tract, the Celtes began to appear a powerful nation under a regular monarchy, or rather under several considerable kingdoms. Mention is made of them indeed in so many parts of Europe, by ancient geographers and historians, that Ortelius took *Celtica* to be a general name for the continent of Europe, and made a map of it bearing this title. In those parts of Asia which they possessed, as well as in the different parts of Europe, the Celtes went by various names. In Lesser Asia they were known by the names of *Titans* and *Sacks*; in the northern parts of Europe, by those of *Gymmerians*, *Cymbrians*, &c.; and in the southern parts they were called Celtes, Gauls, or Galatians.

With respect to the government of the Celtes we

Celsus.

are entirely in the dark. All we know is, that the cures, and afterwards druids and bards, were the interpreters of their laws; judged all causes whether criminal or civil; and their sentence was reckoned so sacred, that whoever refused to abide by it was by them excluded from assisting at their sacred rites; after which no man dared converse with him; so that this punishment was reckoned the most severe of all, even severer than death itself.

They neither reared temples nor statues to the deity, but destroyed them wherever they could find them, planting in their stead large spacious groves; which being open on the top and sides, were, in their opinion, more acceptable to the divine Being, who is absolutely unconfined. In this their religion seems to have resembled that of the Persees and disciples of Zoroaster. The Celtes only differed from them in making the oak, instead of the fire, the emblem of the deity; in chusing that tree above all others to plant their groves with, and attributing several supernatural virtues both to its wood, leaves, fruit, and misletoe; all which were made use of in their sacrifices and other parts of their worship. But after they had adopted the idolatrous superstition of the Romans and other nations, and the apotheosis of their heroes and princes, they came to worship them much in the same manner: as Jupiter under the name of *Taran*, which in the Celtic signifies thunder: Mercury, whom some authors call *Hent*, or *Hesus*, probably from the Celtic *huadh*, which signifies a dog, and might be the *Anubis latrans* of the Egyptians. But Mars was held in the greatest veneration by the warlike, and Mercury by the trading part of the nation. The care of religion was immediately under their cures, since known by the name of druids and bards. These were, as Cæsar tells us, the performers of sacrifices and all religious rites, and expounders of religion to the people. They also instructed youth in all kinds of learning, such as philosophy, astronomy, astrology, &c. Their doctrines were taught only by word of mouth, esteeming them too sacred to be committed to writing. Other more common subjects, such as their hymns to their gods, the exploits of princes and generals in time of war, and especially before a battle, were couched in elegant verse, and recited, or rather sung, on all proper occasions; though even these were also kept from vulgar eyes, and either committed to memory, or if to writing, the whole was a secret to all the laity. The latter indeed seems the most probable, if what Cæsar hints be true; namely, that these poetic records were increased in his time to such a bulk, that it took up a young bard near 20 years to learn them by heart. Diodorus tells us farther, that these poets used to accompany their songs with instrumental music, such as that of organs, harps, and the like; and that they were held in such veneration, that if, in the time of an engagement between two armies, one of these bards appeared, both sides immediately ceased fighting. The reason of this was, that they were universally believed to be prophets, as well as poets; so that it was thought dangerous, as well as injurious, to disobey what they supposed came from their gods. These prophetic philosophers kept academies, which were resorted to not only by a great number of their own youth,

but

Celtis
|
Cedrus.

but also of those from other countries, inasmuch that Aristotle says, their philosophy passed from thence into Greece, and not from Greece thither. Diodorus likewise quotes a passage from Hecateus, which is greatly in their praise; viz. that the druids had some kind of instruments by which they could draw distant objects nearer, and make them appear larger and plainer; and by which they could discover even seas, mountains, and vallies, in the moon. But whatever might be their learning, it is certain, that in process of time they adopted several very barbarous customs, such as sacrificing human victims to their gods as more acceptable to them than those of any other animals. And Diodorus tells us of another inhuman custom they used in their divinations, especially in great matters, which was done by killing some of their slaves, or some prisoners of war, if any they had, with a scimitar, to draw their augury from the running of his blood from his mangled limbs.

For the history, &c. of the different Celtic nations see the article GAUL, &c.

CELTES, certain ancient instruments of a wedge-like form, of which several have been discovered in different parts of Great Britain. Antiquarians have generally attributed them to the Celts; but, not agreeing as to their use, distinguished them by the above unmeaning appellation. But Mr Whittaker makes it probable that that they were British battle-axes. See BATTLE-AX.

CELTIBERIA (anc. geog.) a country of the Hither Spain, along the right or south-west side of the river Iberus; though sometimes the greatest part of Spain was called by the name of Celtiberia. The people were denominated *Celtiberi*, or the Celts seated on the Iberus. They were very brave and warlike, their cavalry in particular was excellent. They wore a black and rough cloak, the flag of which was like goats hair. Some of them had light bucklers like the Gauls; others hollow and round ones like those of other nations. They all wore boots made of hair, and iron helmets adorned with crests of a purple colour. They used swords which cut on both sides, and pinnards of a foot long. Their arms were of an admirable temper, and are said to have been prepared in the following manner: they buried plates of iron under ground, where they let them remain till the rust had eaten the weakest part of the metal, and the rest was consequently hard and firm. Of this excellent iron they made their swords, which were so strong and well tempered, that there was neither buckler nor helmet that could resist their edge. The Celtiberians were very cruel towards their enemies and malefactors, but shewed the greatest humanity to their guests. They not only cheerfully granted their hospitality to strangers, who travelled in their country, but were desirous that they should seek protection under their roof.

CELTIS, the LOTUS, or *Nettle-tree*; a genus of the monœcia order, belonging to the polygamia class of plants. There are three species, all of them hardy deciduous trees, with leaves somewhat resembling the common nettle, proper for ornamental plantations, and two of them also proper for forest-trees. 1. The australis rises with a large upright stem, and very

branchy head, to the height of 40 or 50 feet, garnished with large spear-shaped, pointed, and deeply serrated leaves, with greenish flowers produced in May from the sides of the branches; succeeded by round black fruit, of the size of a black-berry. It is a native of the southern parts of Europe. 2. The occidentalis is a native of America, and hath a large upright stem, with a very branchy head like the former; grows to the height of 40 or 50 feet; with large, oval, sharp-pointed; and deeply sawed oblique leaves; greenish flowers from the sides of the branches in May, succeeded by purple fruit of the size of large peas. 3. The orientalis was discovered by Dr Tournefort in America. It rises with an upright stem, dividing into many spreading, greenish branches, ten or twelve feet high; small, oval, heart-shaped, serrated, oblique leaves; yellowish flowers from the sides of the branches in the spring, succeeded by large, oval, yellow fruit. There are several varieties of each sort, with blotched leaves. They may be propagated by seeds, but the blotched-leaved kinds only by layers, cuttings, grafting, &c. The seeds ought to be sown in autumn, and covered with earth half an inch deep. When the plants appear, they will require to be sheltered by mats from the cold.

CEMENT, in a general sense, any glutinous substance capable of uniting and keeping things together in close cohesion. In this sense the word *cement* comprehends mortar, folder, glue, &c. but has been generally restrained to the compositions used for holding together broken glasses, china, and earthen ware. For this purpose the juice of garlic is recommended as exceedingly proper, being both very strong, and, if the operation is performed with care, leaving little or no mark. Quicklime and the white of an egg mixed together, and expeditiously used, are also very proper for this purpose. Dr Lewis recommends a mixture of quicklime and cheese, in the following manner: "Sweet cheese shaved thin and stirred with boiling hot water, changes into a tenacious lime which does not mingle with the water. Worked with fresh parcels of hot water, and then mixed upon a hot stone, with a proper quantity of unslaked lime, into the consistence of a paste, it proves a strong and durable cement for wood, stone, earthen-ware, and glass. When thoroughly dry, which will be in two or three days, it is not in the least acted upon by water. Cheese barely beat with quicklime, as directed by some of the chemists for luting cracked glasses, is not near so efficacious." A composition of the drying oil of lintseed and white-lead is also used for the same purposes, but is greatly inferior.

CEMENT in building, is used to denote any kind of mortar of a stronger kind than ordinary. The cement commonly used is of two kinds; hot, and cold. The hot cement is made of rosin, bees wax, brick-dust, and chalk, boiled together. The bricks to be cemented are heated, and rubbed one upon another, with cement between them. The cold cement is that above described for cementing china, &c. which is sometimes, though rarely, employed in building.

The ruins of the ancient Roman buildings are found to cohere so strongly, that most people have imagined the ancients were acquainted with some kind of mortar,

Cement.

Cement.

mortar, which, in comparison of ours, might justly be called *cement*; and that to our want of knowledge of the materials they used, is owing the great inferiority of modern buildings in their durability. In 1770, one M. Lorient, a Frenchman, pretended to have discovered the secret of the ancient cement, which, according to him, was no more than a mixture of powdered *quick-lime* with lime which had been long slacked and kept under water. The slacked lime was first to be made up with sand, earth, brick-dust, &c. into mortar after the common method, and then about a third part of quick-lime in powder was added to the mixture. This produced an almost instantaneous petrification, something like what is called the *setting* of alabaster, but in a much stronger degree; and was possessed of many wonderful qualities needless here to relate, seeing it has never been known to succeed with any other person who tried it. Mr. Anderson, in his essays on agriculture, has discussed this subject at considerable length, and seemingly with great judgment. He is the only person we know, who has given any rational theory of the uses of lime in building, and why it comes to be the proper basis of all cements. His account is in substance as follows:

Lime which has been slaked and mixed with sand, becomes hard and consistent when dry, by a process similar to that which produces the natural *stalactites* in caverns. These are always formed by water dropping from the roof. By some unknown and inexplicable process of nature, this water has dissolved in it a small portion of calcareous matter in a *caustic* state. As long as the water continues covered from the air, it keeps the earth dissolved in it; it being the natural property of calcareous earths, when deprived of their fixed air, to dissolve in water. But when the small drop of water comes to be exposed to the air, the calcareous matter contained in it begins to attract the fixable part of the atmosphere. In proportion as it does so, it also begins to separate from the water, and to reassume its native form of limestone or marble. This process, Mr. Anderson calls a *crystallization*; and when the calcareous matter is perfectly *crystallized* in this manner, he affirms that it is to all intents and purposes limestone or marble of the same consistency as before: and "in this manner, (says he,) within the memory of man, have huge rocks of marble been formed near Matlock in Derbyshire." If lime in a caustic state is mixed with water, part of the lime will be dissolved, and will also begin to crystallize. The water which parted with the crystallized lime, will then begin to act upon the remainder, which it could not dissolve before; and thus the process will continue, either till the lime be all reduced to an *effete*, or, (as he calls it) *crystalline* state, or something hinders the action of the water upon it. It is this crystallization which is observed by the workmen when a heap of lime is mixed with water, and left for some time to macerate. A hard crust is formed upon the surface, which is ignorantly called *frothing*, though it takes place in summer as well as in winter. If therefore the hardness of the lime, or its becoming a cement, depends entirely on the formation of its crystals, it is evident, that the perfection of the cement must depend on the perfection of the crystals,

Cement.

and the hardness of the matters which are entangled among them. The additional substances used in making of mortar, such as sand, brick-dust, or the like, according to Mr. Anderson, serve only for a purpose similar to what is answered by sticks put into a vessel full of any saline solution, namely to afford the crystals an opportunity of fastening themselves upon it. If therefore the matter interposed between the crystals of the lime is of a friable, brittle nature, such as brick-dust or chalk, the mortar will be of a weak and imperfect kind; but when the particles are hard, angular, and very difficult to be broken, such as those of river or pit-sand, the mortar turns out exceedingly good and strong. Sea-sand is found to be an improper material for mortar, which Mr. Anderson ascribes to its being less angular than the other kinds. That the crystallization may be the more perfect, he also recommends a large quantity of water, that the ingredients be perfectly mixed together, and that the drying be as slow as possible. An attention to these circumstances, he thinks, would make the buildings of the moderns equally durable with those of the ancients; and from what remains of the ancient Roman works, he thinks a very strong proof of his hypothesis might be adduced. The great thickness of their walls necessarily required a vast length of time to dry. The middle of them was composed of pebbles thrown in at random, and which have evidently had mortar so thin as to be poured in among them. By this means, a great quantity of the lime would be dissolved, and the crystallization performed in the most perfect manner; and the indefatigable pains and perseverance for which the Romans were so remarkable in all their undertakings, leave no room to doubt that they would take care to have the ingredients mixed together as well as possible. The consequence of all this is, that the buildings formed in this manner are all as firm as if cut out of a solid rock; the mortar being equally hard, if not more so, than the stones themselves. For the proper proportion of lime and sand requisite in building, see the article MORTAR.

CEMENT, among engravers, jewellers, &c. is the same with the hot cement used in building*; and is used for keeping the metals to be engraven firm to the block, and also for filling up what is to be chiselled.

CEMENT, in chemistry, is used to signify all those powders and pastes with which any body is surrounded in pots or crucibles, and which are capable by the help of fire of producing changes upon that body. They are made of various materials; and are used for different purposes, as for parting gold from silver, converting iron into steel, copper into brass: and by cementation, more considerable changes can be effected upon bodies, than by applying to them liquids of any kind; because the active matters are then in a state of vapour, and assisted by a very considerable degree of heat.

CEMENT which quickly hardens in Water. This is described in the posthumous works of Mr. Hooke, and is recommended for gilding live craw-fish, carps, &c. without injuring the fish. The cement for this purpose is prepared, by putting some Burgundy pitch into a new earthen pot, and warming the vessel till it receives so much of the pitch as will stick round it; then

* See the foregoing article.

Cement
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then strewing some finely powdered amber over the pitch when growing cold, adding a mixture of three pounds of linseed oil, and one of oil of turpentine, covering the vessel and boiling them for an hour over a gentle fire, and grinding the mixture as it is wanted with as much pumice-stone in fine powder as will reduce it to the consistence of paint. The fish being wiped dry, the mixture is spread upon it; and the gold leaf being then laid on, the fish may be immediately put into water again, without any danger of the gold coming off, for the matter quickly grows hard in the water.

CEMENT-POTS, are those earthen pots used in the cementation of metals.

CEMENTATION, the act of corroding or otherwise changing a metal by means of a cement. See the foregoing article.

CEMETERY, *Κοιμητήριον*, from *κοιμαιναι* to "sleep;" a place set apart or consecrated for the burial of the dead.

Anciently none were buried in churches or churchyards: it was even unlawful to inter in cities, and the cemeteries were without the walls. Among the primitive Christians these were held in great veneration. It even appears from Eusebius and Tertullian, that, in the early ages, they assembled for divine worship in the cemeteries. Valerian seems to have confiscated the cemeteries and other places of divine worship, but they were restored again by Gallienus. As the martyrs were buried in these places, the Christians chose them for building churches on, when Constantine established their religion; and hence some derive the rule which still obtains in the church of Rome, never to consecrate an altar without putting under it the relics of some saint. The practice of consecrating cemeteries is of some antiquity. The bishop walked round it in procession, with the crozier or pastoral staff in his hand, the holy water pot being carried before, out of which the aspersions were made.

CENOBIITE. See **COENOBITE**.

CENOTAPH, in antiquity, an empty tomb, erected by way of honour to the deceased. It is distinguished from a sepulchre, in which a coffin was deposited. Of these there were two sorts; one for those who had, and another for those who had not, been honoured with funeral rites in another place.

The sign whereby honorary sepulchres were distinguished from others, was commonly the wreck of a ship, to denote the decease of the person in some foreign country.

CENSER, a vase containing incense to be used in offering sacrifices. It was used by the heathens as well as Jews, and is still used in the Romish churches.

CENSOR, (from *censere* to "see" or "perceive"), one of the prime magistrates in ancient Rome.—Their business was to register the effects of the Roman citizens, to impose taxes in proportion to what each man possessed, and to take cognizance or inspection of the manners of the citizens. In consequence of this last part of their office, they had a power to censure vice or immorality by inflicting some public mark of ignominy on the offender. They had even a power to create the *princeps senatus*, and to expel from the senate such as they deemed unworthy of that office.

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This power they sometimes exercised without sufficient grounds; and therefore, a law was at length passed, that no senator should be degraded or disgraced in any manner, until he had been formally accused and found guilty by both the censors. It was also a part of the censorian jurisdiction, to fill up the vacancies in the senate, upon any remarkable deficiency in their number; to let out to farm all the lands, revenues, and customs, of the republic; and to contract with artificers for the charge of building and repairing all the public works and edifices both in Rome, and the colonies of Italy. In all parts of their office, however, they were subject to the jurisdiction of the people; and an appeal always lay from the sentence of the censors to that of an assembly of the people.

The first two censors were created in the year of Rome 311, upon the senate's observing that the consuls were so much taken up with war, as not to have time to look into other matters. The office continued to the time of the emperors, who assumed the censorial power, calling themselves *morum prefetti*; though Vespasian and his sons took the title of censors. Decius attempted to restore the dignity to a particular magistrate. After this we hear no more of it, till Constantine's time, who made his brother censor, and he seems to have been the last that enjoyed the office.

The office of censor was so considerable, that for a long time none aspired to it, till they had passed all the rest; so that it was thought surprising that Crassus should be admitted censor, without having been either consul or prætor. At first the censors enjoyed their dignity for five years, but in 420 the dictator Mamertinus made a law restraining it to a year and an half, which was afterwards observed very strictly. At first one of the censors was elected out of a patrician, and the other out of a plebeian family; and upon the death of either, the other was discharged from his office, and two new ones elected, but not till the next lustrum. In the year of Rome 622, both censors were chosen from among the plebeians; and after that time the office was shared between the senate and people.—After their election in the Comitia Centuriata, the censors proceeded to the capitol, where they took an oath not to manage either by favour or disaffection, but to act equitably and impartially throughout the whole course of their administration.

The republic of Venice still has a censor of the manners of their people, whose office lasts six months.

CENSORS of Books, are a body of doctors or others established in divers countries, to examine all books before they go to the press, and to see they contain nothing contrary to faith and good manners.

At Paris, the faculty of theology claim this privilege, as granted to them by the pope; but, in 1624, new commissions of four doctors were created, by letters-patent, the sole censors of all books, and answerable for every thing contained therein.

In England, we had formerly an officer of this kind, under the title of licenser of the press; but, since the revolution, our press has been laid under no such restraint.

CENSORINUS, a celebrated writer in the third century, well known by his treatise *De Die Natali*. This treatise, which was written about the year 238,

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Gerard

Gerard Vossius calls it a little book of gold; and declares it to be a most learned work, of the highest use and importance to chronologers, since it connects and determines, with great exactness, some of the principal eras in pagan history. It was printed at Cambridge, with the notes of Lindenbrokius, in 1695.

CENSURE, a judgment which condemns some book, person, or action, or, more particularly, a reprimand from a superior. Ecclesiastical censures, are penalties by which, for some remarkable misbehaviour, Christians are deprived of the communion of the church, or prohibited to execute the sacerdotal office.

CENSUS, in Roman antiquity, an authentic declaration made before the censors, by the several subjects of the empire, of their respective names and places of abode. This declaration was registered by the censors; and contained an enumeration, in writing, of all the estates, lands, and inheritances they possessed; their quantity, quality, place, wives, children, domestics, tenants, slaves. In the provinces the census served not only to discover the substance of each person, but where, and in what manner and proportion, taxes might be imposed. The census at Rome is commonly thought to have been held every five years; but Dr Middleton hath shewn, that both census and lustrum were held irregularly and uncertainly at various intervals. The census was an excellent expedient for discovering the strength of the state: for by it they discovered the number of the citizens, how many were fit for war, and how many for offices of other kinds; how much each was able to pay of taxes, &c. It went through all ranks of people, though under different names: that of the common people was called *census*; that of the knights, *census, recensio, recognitio*; that of the senators, *lectio, religio*.

The census which intitled one to the dignity of a knight, was 400,000 sesterces: that of a senator, was double that sum.

In the Voconian law, census is used for a man whose estate in the censor's books is valued at 100,000 sesterces.

CENT, signifies properly an hundred, being an abridgement of the word *centum*; but is often used in commerce to express the profit or loss arising from the sale of any commodity: so that when we say there is 10 per cent profit, or 10 per cent loss, upon any merchandise that has been sold, it is to be understood, that the seller has either gained or lost ten pounds on every hundred pounds of the price at which he bought that merchandise; which is $\frac{1}{10}$ of profit, or $\frac{1}{10}$ of loss, upon the total of the sale.

CENTAURS, in mythology, a kind of fabulous monsters, half men and half horses.—The poets pretend that the centaurs were the sons of Ixion and a cloud; the reason of which fancy is, that they retired to a castle called *νεφέλη*, which signifies a "cloud."—This fable is differently interpreted: some will have the centaurs to have been a body of shepherds and herdsmen, rich in cattle, who inhabited the mountains of Arcadia, and to whom is attributed the invention of bucolic poetry. Palephatus, in his book of incredibles, relates, that under the reign of Ixion, king of Thessaly, a herd of bulls on mount Thessaly run mad, and rava-

ged the whole country, rendering the mountains inaccessible; that some young men who had found the art of taming and mounting horses, undertook to clear the mountains of these animals, which they purified on horseback, and thence obtained the appellation of *Centours*. This success rendering them insolent, they insulted the Lapithæ, a people of Thessaly; and because when attacked they fled with great rapidity, it was supposed they were half horses and half men.—The Centaurs in reality were a tribe of Lapithæ, who inhabited the city Pelethronium adjoining to mount Pelion, and first invented the art of breaking horses, as is intimated by Virgil.

CENTAUREA, GREATER CENTAURY; a genus of the polygamia frustanea order, belonging to the syn-genesia class of plants. There are 61 species. The root of one of them called *glasifolia*, is an article in the materia medica. It has a rough, somewhat acrid taste, and abounds with a red viscid juice. Its rough taste has gained it some esteem as an astringent; its acrimony, as an aperient; and its glutinous quality, as a vulnerary; but the present practice takes very little notice of it in any intention. Another of the species is the cyanus or blue-bottle, which grows commonly among corn. The expressed juice of this flower stains linen of a beautiful blue colour, but is not permanent. Mr Boyle says, that the juice the inner petals, with a little alum, makes a beautiful permanent colour, equal to ultramarine.

Lesser CENTAURY. See **GENTIANA**.

CENTENARIUS, or CENTENARIO, in the middle age, an officer who had the government or command, with the administration of justice, in a village. The centenarii as well as vicarii were under the jurisdiction and command of the court. We find them among the Franks, Germans, Lombards, Goths, &c.

CENTENARIUS was also used for an officer who had the command of 100 men; most frequently called a **CENTURION**.

CENTENARIUS, in monasteries, was an officer who had the command of 100 monks.

CENTENINUM OVUM, among naturalists, denotes a sort of hen's egg much smaller than ordinary, vulgarly called a *cock's egg*; from which it has been fabulously held that the cockatrice or basilisk is produced. The name is taken from an opinion, that these are the last eggs which hens lay, having laid 100 before; whence *centeninum*, q. d. the hundredth egg.—These eggs have no yolks, but in other respects differ not from common ones; having the albumen, chazazes, membranes, &c. in common with others. In the place of the yolk is found a little body like a serpent coiled up, which doubtless gave rise to the fable of the basilisk's origin from thence. Their origin is with probability ascribed by Hervey to this, that the yolks in the vitellary of the hen are exhausted before the albumina.

CENTER, or CENTRE, in a general sense, signifies a point equally distant from the extremities of a line, figure, or body. The word is formed from the Greek *κέντρον*, a "point."

CENTER of Gravity, in mechanics, that point about which all the parts of a body do in any situation exactly balance each other.

CENTER

CENTER of Motion, that point which remains at rest, while all the other parts of a body move about it.

CENTER of a Sphere, a point in the middle, from which all lines drawn to the surface are equal.

Hermes Trifingestus defines God an intellectual sphere, whose center is every where, and circumference no where.

CENTESIMATION, a milder kind of military punishment, in cases of desertion, mutiny, and the like, when only every hundredth man is executed.

CENTILOQUIUM, denotes a collection of 100 sentences, opinions, or sayings.

The centiloquium of Hermes, contains 100 aphorisms, or astrological sentences, supposed to have been written by some Arab, falsely fathered on Hermes Trifingestus. It is only extant in Latin, in which it has several times been printed.—The centiloquium of Ptolemy is a famous astrological piece, frequently confounded with the former, consisting likewise of 100 sentences, or doctrines, divided into short aphorisms, intitled also in Greek *κατάμνησις*, as being the fruit or result of the former writings of that celebrated astronomer, viz. his *quadripartitum* and *almagestum*; or rather, by reason that herein is shewn the use of astrological calculations.

CENTIPES, in zoology. See *SCOLOPENDRA*.

CENTIPED WORM, a term used for such worms as have a great many feet, though the number does not amount to 100, as the term seems to import.—M. Maloet relates the history of a man, who, for three years, had a violent pain in the lower part of the forehead near the root of the nose: at length he felt an itching, and afterwards something moving within his nostril, which he brought away with his finger; it was a worm of the centiped kind, an inch and a half long, which run swiftly. It lived five or six days among tobacco. The patient was free of his pain ever after. Mr LITTLE mentioned a like case in 1708, of a larger centiped voided at the nose, after it had thrown the woman, in whose frontal sinus it was, into convulsions, and had almost deprived her of her reason.

CENTLIVRE (Susanna), a celebrated comic writer, was the daughter of Mr Freeman of Holbeach, in Lincolnshire; and had such an early turn for poetry, that it is said she wrote a song before she was seven years old. Before she was twelve years of age, she could not only read Moliere in French, but enter into the spirit of all the characters. Her father dying, left her to the care of a step-mother, whose treatment not being agreeable to her, she determined, though almost destitute of money and every other necessary, to go up to London to seek a better fortune than what she had hitherto experienced. As she was proceeding on her journey on foot, she was met by a young gentleman from the University of Cambridge, the afterwards well-known Anthony Hammond, Esq; who was so extremely struck with her youth and beauty, that he fell instantly in love with her; and inquiring into the particulars of her story, soon prevailed upon her unexperienced innocence to seize on the protection he offered her, and go with him to Cambridge. After some months cohabitation, he persuaded her to come to London; where, in a short

time, she was married to a nephew of Sir Stephen Fox. But that gentleman not living with her above a twelve-month, her wit and beauty soon procured her a second husband, whose name was *Carrol*, and who was an officer in the army; but he having the misfortune to be killed in a duel about a year and an half after their marriage, she became a second time a widow. For the sake of support she now applied to her pen, and became avotary of the muses; and it is under this name of *Carrol* that some of her earlier pieces were published. Her first attempt was in tragedy, in a play called the *Injured Husband*; yet her natural vivacity leading her afterwards to comedy, we find but one more attempt in the buskin, among 18 dramatic pieces which she afterwards wrote.

In 1706, she wounded the heart of one Mr Joseph Centlivre, yeoman of the mouth, or in other words principal cook, to her Majesty, who married her; and, after passing several years happily together, she died at his house in Spring-Garden, Charing-Cross, in December 1723.

This lady for many years enjoyed the intimacy and esteem of the most eminent wits of the times, viz. Sir Richard Steele, Mr Rowe, Budgell, Farquhar, Dr Sewell, &c. and very few authors received more tokens of esteem and patronage from the great. With regard to her merit as a writer, it must be allowed that her plays do not abound with wit, and that the language of them is sometimes even poor, enervate, incorrect, puerile; but then her plots are busy and well conducted, and her characters in general natural and well marked.

CENTO, in poetry, a work wholly composed of verses or passages promiscuously taken from other authors, only disposed in a new form and order.—*Proba Falconia* has written the life of Jesus Christ in centos taken from Virgil. Alexander Ross has done the like in his *Christados*, and Stephen de Pleure the same.

CENTONARIUM, in antiquity, certain of the Roman army, who provided different sorts of stuff called centones, made use of to quench the fire which the enemies engines threw into the camp.

These centonarii kept with the carpenters and other officers of artillery.

CENTRAL FORCES, the powers which cause a moving body to tend towards, or recede from, the center of motion. See *MECHANICS*.

CENTRAL RULE, a rule discovered by Mr Thomas Baker, whereby to find the center of a circle designed to cut the parabola in as many points as an equation to be constructed hath real roots. Its principal use is in the construction of equations, and he hath applied it with good success as far as biquadratics.

The central rule is chiefly founded on this property of the parabola, that, if a line be inscribed in that curve perpendicular to any diameter, a rectangle formed of the segments of the infcript is equal to the rectangle of the intercepted diameter and parameter of the axis.

The central rule has the advantage over Cartes and De Latere's methods of constructing equations, in that both these are subject to the trouble of preparing the equation by taking away the second term.

Centrifugal.

CENTRIFUGAL FORCE, that force by which all bodies that move round any other body in a curve, endeavour to fly off from the axis of their motion in a tangent to the periphery of the curve, and that in every part of it. See **MECHANICS**.

CENTRIFUGAL Machine, a very curious machine, invented by Mr Erskine, for raising water by means of the centrifugal force combined with the pressure of the atmosphere.

It consists of a large tube of copper, &c. in the form of a cross, which is placed perpendicular in the water, and rests at the bottom on a pivot. At the upper part of the tube is a horizontal cog-wheel, which touches the cogs of another in a vertical position; so that by the help of a double winch, the whole machine is moved round with very great velocity.

Near the bottom of the perpendicular part of the tube is a valve opening upwards; and near the two extremities, but on the contrary sides of the arms, or cross part of the tube, are two other valves opening outwards. These two valves are, by the assistance of springs, kept shut till the machine is put in motion, when the centrifugal velocity of the water forces them open, and discharges itself into a cistern or reservoir placed there for that purpose.

On the upper part of the arms are two holes, which are closed by pieces screwing into the metal of the tube. Before the machine can work, these holes must be opened, and water poured in through them, till the whole tube be full: by this means all the air will be forced out of the machine, and the water supported in the tube by means of the valve at the bottom.

The tube being thus filled with water, and the holes closed by their screw caps, it is turned round by means of the winch, when the water in the arms of the tube acquires a centrifugal force, opens the valves near the extremities of the arms, and flies out with a velocity nearly equal to that of the extremities of the said arms.

The above description will be very easily understood by the figure we have added on Plate LXXV. fig. 3. which is a perspective view of the centrifugal machine, erected on board a ship. ABC is the copper tube. D, a horizontal cog-wheel, furnished with twelve cogs. E, a vertical cog-wheel, furnished with thirty-six cogs. F, F, the double winch. a, the valve near the bottom of the tube. b, b, the two pivots on which the machine turns. c, one of the valves in the cross-piece; the other at d, cannot be seen in this figure, being on the other side of the tube; e, e, the two holes through which the water is poured into the machine. GH, the cistern, or reservoir. I, I, part of the ship's deck. The distance between the two valves c, d, is six feet. The diameter of these valves is about three inches; and that of the perpendicular tube about seven inches.

If we suppose the men who work the machines can turn the winch round in three seconds, the machine will move round its axis in one second; and consequently each extremity of the arms will move with a velocity of 18.8 feet in a second. Therefore a column of water of three inches diameter will issue through each of the valves with a velocity of 18.8 feet in a second: but the area of the aperture of each

of the valves is 7.14 inches; which being multiplied by the velocity in inches=225.6, gives 1610.784 cubic inches, the quantity of water discharged through one of the apertures in one second; so that the whole quantity discharged in that space of time through both the apertures is=3221.568 inches; or 193294.08 cubic inches in one minute. But 60812 cubic inches make a tun, beer-measure; consequently, if we suppose the centrifugal machine revolves round its axis in one second, it will raise nearly 3 tuns 44 gallons in one minute: but this velocity is certainly too great, at least to be held for any considerable time; so that, when this and other deficiencies in the machine are allowed for, two tuns is nearly the quantity that can be raised by it in one minute.

It will perhaps be unnecessary to observe, that as the water is forced up the perpendicular tube by the pressure of the atmosphere, this machine cannot raise water above 32 feet high.

An attempt was made to substitute this machine in place of the pumps commonly used on ship-board, but the labour of working was found to be so great as to render the machine inferior to the chain-pump. A considerable improvement, we apprehend, would be, to load with a weight of lead the ends of the tubes through which the water issues, which would make the machine turn with a great deal more ease, as the centrifugal force of the lead would in some measure act the part of a fly.

CENTRIPETAL FORCE, that force by which a body is every where impelled, or any how tends, towards some point as a center. See **MECHANICS**.

CENTRISCUS in ichthyology, a genus of fishes belonging to the order of amphibia nantes. The head gradually ends in a narrow snout, the aperture is broad and flat; the belly is carinated; and the belly-fins united. There are two species, viz. 1. The scutatus has its back covered with a smooth bony shell, which ends in a sharp spine under which is the tail; but the back-fins are between the tail and the spine. It is a native of the East Indies. 2. The scolopax has a rough scabrous body, and a straight extended tail. It has two belly-fins, with four rays in each, and has no teeth. It is found in the Mediterranean.

CENTUMVIRI, in Roman antiquity, judges appointed to decide common causes among the people: they were chosen, three out of each tribe; and though five more than an hundred, were nevertheless called *centumviri*, from the round number *centum*, an hundred.

CENTURION, among the Romans, an officer in the infantry, who commanded a century, or an hundred men.

In order to have a proper notion of the centuries, it must be remembered, that every one of these triarii * in a legion was divided into two *ordini*, or ranks; and consequently the three bodies of the hastati, principes, and triarii, into 20 orders a-piece, as into 10 manipuli. Now, every manipulus was allowed two centuries, or captains, one to each order or century: and, to determine the point of priority between them, they were created at two different elections. The 30 who were made first always took the precedence of their fellows; and therefore commanded the right-hand orders, as the others did the left.

Centripetal
|
Centurion.

* See Manipulus.

left. The triarii, or *pilani*, so called from their weapon the *pilum*, being esteemed the most honourable, had their centurions elected first, next to them the principes, and afterwards the hastati; whence they were called *primus et secundus pilus*, *primus et secundus princeps*, *primus et secundus hastatus*; and so on. Here it may be observed, that *primi ordines* is sometimes used in historians for the centurions of these orders; and the centurions are sometimes styled *principes ordinum*, and *principes centurionum*. We may take notice too what a large field there lay for promotion: first through all the orders of the hastati; then quite through the principes; and afterwards from the last order of the triarii to the prinipilus, the most honourable of the centurions, and who deserves to be particularly described. This officer, besides his title of prinipilus, went under the several titles of *dux legionis*, *præfectus legionis*, *primus centurionum*, and *primus centurio*; and was the first centurion of the triarii in every legion. He presided over all the other centurions, and generally gave the word of command by order of the tribunes. Besides this, he had the care of the eagle, or chief standard, of the legion; hence, *aquila præfatus*, is to bear the dignity of prinipilus; and hence *aquila* is taken by Pliny for the said office. Nor was this station only honourable, but very profitable too: for he had a special stipend allowed him, probably as much as a knight's estate; and, when he left that charge, was reputed equal to the members of the equestrian order, bearing the title of *prinipiliarius*, in the same manner as those who had discharged the greatest civil offices were styled ever after, *consulares*, *censores*, &c.

CENTURY, in a general sense, any thing divided into, or consisting of, an hundred parts.

The marquis of Worcester published a *Century* of inventions, (for a specimen of which, see ACOUSTICS, n° 28.) ; and Dr Hooke has given a *decimate* of inventions, as part of a *Century*, of which he affirmed himself master. It is remarkable, that both in the century of the former, and the decimate of the latter, we find the principle on which Savary's fire or steam engine is founded. See STEAM-ENGINE.

CENTURY in antiquity. The Roman people, when they were assembled for the electing of magistrates, enacting of laws, or deliberating upon any public affair, were always divided into centuries, and voted by centuries, in order that their votes might be the more easily collected, whence these assemblies were called *comitia centuriata*. The Roman cohorts were also divided into centuries. See CENTURION, and COHORT.

CENTURY, in chronology, the space of one hundred years. This method of computing by centuries is generally observed in church-history, commencing from the time of our Saviour's incarnation: in which sense we say the first century, the second century, &c.

CENTURIES of Magdeburg, a famous ecclesiastical history, ranged into 13 centuries, carried down to the year 1298, compiled by several hundred Protestants of Magdeburg, the chief of whom was Flacius Illyricus.

CENTUSSIS, in Roman antiquity, a coin containing 100 asses.

CEPA, the ONION; is by Linnæus referred to the genus of allium; the botanic difference of it from garlic is, the swelling pipy stalk, which is much larger in the middle than at either end. The varieties are, the Stralsburgh, the Spanish, and the Egyptian onion. They are propagated by seeds, which should be sown the latter end of February, or the beginning of March, on good, light, rich ground, well dug and levelled, and cleared from weeds. They should also be sown at a time when the surface of the ground is not moist; and where they are intended for a winter crop they must not be sown too thick. The common allowance is six pounds of seed to an acre; though some allow more, in order to have a crop to draw out, which they call cullings. In about six weeks after, the onions will be up and forward enough to hoe; at which time the weeds should be lightly cut up with a small hoe, about two inches and a half broad, as also the onions themselves where they grow too close in bunches, leaving them at this first time, at least two or three inches apart. This, if properly performed, and in a dry season, will preserve the ground clear of weeds at least a month, when they must be hoed over again, leaving them at this time about four or five inches asunder. In six weeks after, they must be hoed a third time. The weeds are now to be carefully cut up, and the onions singled out so as to leave them about six inches square, by which means they will grow much larger than if left too close. This, if well performed, in case the weather proves dry, will keep the onions till they are fit to pull; but if the weather should prove moist, and any of the weeds take root again, the weeds must be pulled out with the hand; for the onions having now begun to bulb, must not be disturbed with a hoe. Towards the middle of August the onions will have arrived at their full growth, which may be known by their blades falling to the ground and shrivelling. At this time therefore, before their necks or blades are withered off, they should be drawn out of the ground, the extreme part of the blade cut off, and the onions laid upon a dry spot of ground, observing to turn them every other day at least, to prevent them from taking root again; which in moist weather they would be apt to do. At any rate they are very apt to grow in the lofts where they are kept all winter; the most effectual method of preventing which is, with a hot iron, slightly to touch their beads or roots, which will effectually prevent their sprouting; but in doing this, great caution must be used not to scorch the pulp; for that will cause them to perish soon after. In order to save seeds, you must in the spring make choice of some of the largest, firmest, and best shapen onions, (in quantity proportionable to the seed you intend to save) and having prepared a piece of good ground, which should be well dug, and laid out in beds about three feet wide, the onions must be planted in the beginning of March in the following manner: Having strained a line of about four inches within the side of the bed, you must with a spade throw out an opening six inches deep, the length of the bed, into which you should place the onions with their roots downward, at about nine inches distance from each other; and with a rake draw the earth into the opening again to

cover

Cep.
||
Cephalanthus.

cover the bulbs; then proceed to remove the line again about a foot farther back, where you must make an opening as before, and so again, till the whole is finished, by which you will have four rows in each bed; between each bed you must allow the space of two feet for an alley to go among them. In a month's time the leaves will appear above ground, and many of the roots will produce three or four stalks each. About the beginning of June, when the flowers begin to appear, the stalks must be tied to stakes to prevent them from being broke by their own weight. About the end of August the seed will be ripe, which may be known by the opening of the cells which contain it, and its changing to a brown colour. When the heads are cut off, they should be spread abroad upon coarse cloths in the sun, observing to keep it under shelter in the night, as also in wet weather. When the heads are quite dry, the seeds should be beat out from them; and after being cleared from the hulks, and exposed one day to the sun to dry, they may be put up in bags for use.

Besides the above mentioned species of onions, the scallions, or scallions, Welsh onions, and cives were formerly in great repute. The former is a sort which never forms any bulbs at the roots, and was chiefly used in the spring for green onions; but is now become so scarce as hardly to be known. Some gardeners instead of the scallion, substitute such onions as decay and sprout in the house. These they plant in a bed early in the spring, and in a short time they become large enough for use. The true scallion is easily propagated by parting the roots either in spring or autumn; but the latter is preferable. The roots should be planted three or four in a hole, and about six inches distance every way.

The cives are a very small sort of onion, which never produce any bulbs, and seldom grow above six inches high in the blade, which is very small and slender. They grow in round bunches like the former. They are propagated by parting their roots like the former, and are very hardy.

The Welsh onions are propagated only for spring use; they never make any bulbs, and are therefore fit only to be used green for salads. They are sown in the end of July, in beds about three feet and a half wide. In a fortnight's time they appear above ground, but in October their blades die, and the ground becomes quite naked; in January, however, they will again appear very strong, and in March will be fit to draw for young onions.

Onions are supposed to afford little nourishment; and, when eaten liberally, produce flatulencies, occasion thirst, head-achs, and turbulent dreams; in cold phlegmatic habits, where viscid mucus abounds, they are undoubtedly of use, by their stimulatory and attenuating qualities. By some they are strongly recommended in suppressions of urine and dropsies. Their chief medicinal use at present, however, is in external applications, as a cataplasm for suppurating tumours, &c.

CEPHALALGIA, or HEAD-ACH. See (the *Index* subjoined to) MEDICINE.

CEPHALANTHUS, BUTTON-WOOD; a genus of the monogynia order, belonging to the tetrandria class

of plants. There is only one species, a native of North America, from whence the seeds are imported into Britain, and great numbers of the plants raised in the gardens of the curious. It seldom rises higher than five or six feet in this country. The branches come out opposite, sometimes by pairs, and at other times there are three arising at the same joint. The ends of the branches are terminated by spherical heads, about the size of a marble, each of which are composed of many small flowers, funnel-shaped, and of a whitish yellow colour, fastened to an axis that stands in the middle. They are propagated chiefly by seeds, though many are also raised from cuttings: they require a little shelter from cold when young, as well as from the sun in very hot weather; but in other respects are hardy enough. They thrive best in a moist soil.

CEPHALIC, in a general meaning, signifies any thing belonging to the head.

CEPHALIC Medicines, are remedies for disorders of the head. Cordials are comprehended herein, as are also whatever promotes a free circulation of the blood through the brain.

Except when the disorder arises from excess of heat, or an inflammatory disposition in the head, moist topicals should never be used; but always dry ones.

To rub the head after it is shaved proves an instantaneous cure for a cephalalgia, a stuffing of the head, and a weakness of the eyes, arising from a weak and relaxed state of the fibres. And as by every fresh evacuation of the humours their quantity is not only lessened, but also their recementitious parts derived thither, the more frequently the head is shaved, the larger quantity of humour is discharged; so that the frequent shaving of the head and beard is likewise a perpetual blister; and in as much as it is useful, it is a cephalic.

CEPHALIC Vein, in anatomy, creeps along the arm between the skin and the muscles, and divides it into two branches: the external goes down to the wrist, where it joins the basilica, and turns up to the back of the hand; the internal branch, together with a small one of the basilica, makes the median. See Plate XVII. 10, 10. 12.

The ancients used to open this vein for disorders of the head, for which reason it bears this name; but a better acquaintance with the circulation of the blood informs us, that there is no foundation for such a notion.

CEPHALONIA, the capital of an island of the same name, situated in the Mediterranean, near the coast of Epirus, and subject to the Venetians. E. Long. 21. N. Lat. 30. 30.

CEPHEUS, in fabulous history, a king of Arcadia, on whose head Minerva fastening one of Medusa's hairs, he was rendered invincible.

CEPHEUS, in astronomy, a constellation of the northern hemisphere. See ASTRONOMY, n° 206.

CERAM, an island in the Indian ocean, between the Molucca islands on the north, and those of Amboyna and Banda on the south, lying between E. Long. 126. and 129. in S. Lat. 3. It is about 150 miles long, and 60 broad; and here the Dutch have a fortress, which keeps the natives in subjection.

CERAMBYX,

Cephalic
||
Ceram.

Cerambyx
|
Ceraunia.

CERAMBYX, in zoology, a genus of insects of the beetle kind, belonging to the order of insecta coleoptera. The antennæ are long and small; the breast is spinous or gibbous; and the elytra are linear. There are no less than 83 species enumerated by Linnaeus, principally distinguished by the figure of the breast.

CERASTES, in zoology, the trivial name of a species of *ANGUIS* and *COLUMBER*.

CERASTIUM, MOUSE-EAR; a genus of the pentagynia order, belonging to the decandria class of plants. There are 16 species, but none of them possessed of any remarkable property.

CERASUS, in botany. See *PRUNUS*.

CERATE, in pharmacy, a thickish kind of ointment, applied to ulcerations, excoriations, &c. See *PHARMACY*, n° 980. 1010, 1011, 1012.

CERATION, the name given by the ancients to the small seeds of *Ceratonia*, used by the Arabian physicians as a weight to adjust the doses of medicines; as the grain weight with us took its rise from a grain of barley.

CERATION, or *Ceratum*, was also a silver coin, equal to one third of an obolus.

CERATOCEPHALUS, in botany. See *BIDENS*.

CERATOIDES, in botany. See *URTICA*.

CERATONIA, the *CAROB*, or *Sr John's-bread*; a genus of the polyæcia order, belonging to the polygamia class of plants. There is but one species, a native of Spain, of some parts of Italy, and the Levant. It is an ever-green; and, in the countries where it is native, grows in the hedges. It produces a quantity of long, flat, brown-coloured pods, which are thick, leathery, and of a sweetish taste. These pods are many times eaten by the poorer sort of inhabitants when there is a scarcity of other food; but they are apt to loosen the belly, and cause gripings of the bowels. The tree may be propagated in this country from seeds, which are to be sown on a moderate hot-bed, and the plants inured to the open air by degrees.

CERAUNIA, **CERAUNIAS**, or **CERAUNIUS**, *Lapis*, in natural history, a sort of flinty stone of no certain colour, but of a pyramidal or wedge-like figure; popularly supposed to fall from the clouds in the time of thunder-storms, and to be possessed of divers notable virtues, as promoting sleep, preserving from lightning, &c. The word is from the Greek *νεφελος*, *thunder-bolt*. The *ceraunia* is the same with what is otherwise called the thunder-stone, or thunder-bolt; and also sometimes *figitta*, or arrow's-head, on account of its shape. The *ceraunia* are frequently confounded with the omuriz and brontiz, as being all supposed to have the same origin. The generality of naturalists take the *ceraunia* for a native stone, formed among the Pyrites, of a saline, concrete, mineral juice. Mercatus and Dr Woodward assert it to be artificial, and to have been fashioned thus by tools. The *ceraunia*, according to these authors, are the heads of the ancient weapons of war, in use before the invention of iron; which, upon the introduction of that metal, growing into disuse, were dispersed in the fields through this and that neighbouring country. Some of them had possibly served in the early ages for axes,

others for wedges, others for chisels; but the greater part for arrow-heads, darts, and lances. The *ceraunia* is also held by Pliny for a white or crystal-coloured gem, that attracted lightning to itself. What this was, is hard to say. Prudentius also speaks of a yellow *ceraunia*; by which he is supposed to mean the carbuncle or pyropus.

CERBERA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants. The most remarkable species is the *atracur*, a native of the warm parts of America. It rises with an irregular stem to the height of eight or ten feet, sending out many crooked diffused branches, which towards their tops are garnished with thick succulent leaves of a lucid green, smooth, and very full of a milky juice. The leaves come out in loose bunches at the end of the branches; they are of a cream colour, having long narrow tubes, and at the top are cut into five obtuse segments, which seem twisted, so as to stand oblique to the tube. The wood of this tree stinks most abominably, and the kernels of the nuts are a deadly poison to which there is no antidote; so that the Indians will not even use the wood for fuel.

CERBERUS, in fabulous history, a dreadful three-headed mastiff, born of Typhon and Echidna, and placed to guard the gates of hell. He fawned upon those who entered, but devoured all who attempted to get back. He was, however, mastered by Hercules, who dragged him up to the earth, when, in struggling, a foam dropped from his mouth, which produced the poisonous herb called *aconite* or *wolf's-bane*.

CERCELE, in heraldry: a cross cercele is a cross, which opening at the ends, turns round both ways like a ram's horn. See *CROSS*.

CERCIS, the **JUDAS-TREE**; a genus of the monogynia order, belonging to the decandria class of plants.

Species 1. The *siliquastrum*, or common Judas-tree, is a native of the south of France, Spain, and Italy. It rises with an upright trunk to the height of 12 or 14 feet, covered with a dark reddish bark, and divides upward into many irregular branches, garnished with round, heart-shaped, smooth leaves, placed irregularly on the branches, having long foot-stalks. The flowers come out on every side of the branches, and many times from the stem of the tree, in clusters, having short foot-stalks; they are of a very bright purple colour, so make a fine appearance, especially when the branches are covered pretty thick with them. The leaves having an agreeable poignancy, are frequently eaten in salads. There are other two varieties of this tree; one with a white, and the other with a flesh-coloured flower; but the first is the most beautiful. 2. The *canadensis*, or red-bud tree, is a native of most parts of North America, and hath flowers resembling the former, but inferior in beauty. These plants are hardy enough to bear the open air, and are easily propagated from seeds. The wood of the first sort is beautifully veined with black and green, and takes a fine polish. By the Portuguese it is called the *tree of love*.

CERCOPTHECI, in natural history, the name given by Mr Ray to monkeys, or the class of apes with long tails. See *APES* and *SIMIA*.

CERDA (John Lewis de la), a learned Jesuit of Toledo, wrote large commentaries on Virgil, which have

Cerbera
||
Cerda.

Cerdonians have been much esteemed; also several other works.

He died in 1643, aged 80.

Cerebellum.

CERDONIANS, ancient heretics, who maintained most of the errors of Simon Magus, Saturninus, and the Manichees. They took their name from their leader *Cerdon*, a Syrian, who came to Rome in the time of Pope Hyginus, and there abjured his errors: but in appearance only; for he was afterwards convicted of perfiting in them, and accordingly cast out of the church again. Cerdon asserted two principles; the one good, and the other evil: this last, according to him, was the creator of the world, and the god that appeared under the old law. The first, whom he called *unknown*, was the father of Jesus Christ; who, he taught, was incarnate only in appearance, and was not born of a virgin; nor did he suffer death but in appearance. He denied the resurrection; and rejected all the books of the Old Testament, as coming from an evil principle. Marcion, his disciple, succeeded him in his errors.

CERFALIA, in antiquity, feasts of Ceres, instituted by Triptolemus, son of Celeus king of Eleusine in Attica, in gratitude for his having been instructed by Ceres, who was supposed to have been his nurse, in the art of cultivating corn and making bread.

There were two feasts of this kind at Athens; the one called *Eleusinia*, the other *Thefophoria*. See the article ELEUSINIA. What both agreed in, and was common to all the *cerealia*, was, that they were celebrated with a world of religion and purity; so that it was esteemed a great pollution to meddle, on those days, in conjugal matters. It was not Ceres alone that was honoured here, but also Bacchus. The victims offered were hogs, by reason of the waste they make in the products of the earth: whether there was any wine offered, or not, is matter of much debate among the critics. Plautus and Macrobius seem to countenance the negative side; Cato and Virgil the positive. Macrobius says, indeed, they did not offer wine to Ceres, but *mulsum*, which was a composition of wine and honey boiled up together: that the sacrifice made on the 21st of December to that goddess and Hercules, was a pregnant sow, together with cakes and mulsum; and that this is what Virgil means by *Mili Baccho*. The *cerealia* passed from the Greeks to the Romans, who held them for eight days successively; commencing, as generally held; on the fifth of the ides of April. It was the women alone who were concerned in the celebration, all dressed in white: the men, likewise in white, were only spectators. They eat nothing till after sun-set; in memory of Ceres, who in her search after her daughter took no repast but in the evening.

After the battle of Cannæ, the desolation was so great at Rome, that there were no women to celebrate the feast, by reason they were all in mourning; so that it was omitted that year.

CERFALIA, in botany, from *Ceres* the goddess of corn; Linnaeus's name for the larger esculent seeds of the grasses: these are rice, wheat, rye, barley, oats, millet, panic grass, Indian millet, holcus, zizania, and maize. To this head may be likewise referred *dandel*, (*scilium*); which, by preparation, is rendered esculent.

CEREBELLUM. See ANATOMY, n° 398.

CEREBRUM, the BRAIN. Its structure and use are not so fully known as some other parts of the body, and different authors consider it in various manners. However, according to the observations of those most famed for their accuracy and dexterity in anatomical inquiries, its general structure is as given in ANATOMY, n° 397.

Dr Hunter observes, that the principal parts of the medullary substance of the brain in ideots and madmen, such as the *thalami nervorum opticorum*, and *medulla oblongata*, are found entirely changed from a medullary to a hard, tough, dark-coloured substance, sometimes resembling white leather.

CEREMONIAL, (*ceremoniale*), a book in which is prescribed the order of the ceremonies to be observed in certain actions and occasions of solemnity and pomp. The ceremonial of the Roman church is called *ordo Romanus*. It was published in 1516 by the bishop of Corcyra; at which the college of cardinals were so scandalized, that some of them voted to have the author as well as book burnt, for his temerity in exposing the sacred ceremonies to the eyes of profane people.

CEREMONIAL is also used for the set or system of rules and ceremonies which custom has introduced for regulating our behaviour, and which persons practise towards each other, either out of duty, decency, or civility.

CEREMONIAL, in a more particular sense, denotes the manner in which princes and ambassadors use to receive and to treat one another. There are endless disputes among sovereigns about the *ceremonial*: some endeavouring to be on a level, and others to be superior; inasmuch that numerous schemes have been proposed for settling them. The chief are, 1. to accommodate the difference by compromise, or alternation, so that one shall precede now, the other the next time; or one in one place, and the other in another: 2. By seniority; so that an elder prince in years shall precede a younger, without any other distinction. These expedients, however, have not yet been accepted of by any, except some *alternate princes*, as they are called, in Germany.

CEREMONIAL is more particularly used in speaking of the laws and regulations given by Moses relating to the worship of God among the ancient Jews. In this sense it amounts to much the same with what is called the *Levitical law*, and stands contradistinguished from the moral as well as judicial law.

CEREMONY, an assemblage of several actions, forms and circumstances, serving to render a thing more magnificent and solemn.

In 1646, M. Ponce published a history of ancient ceremonies, tracing the rise, growth, and introduction of each rite into the church, and its gradual advancement to superstition therein. Many of them were borrowed from Judaism; but more, seemingly, from Paganism. Dr Middleton has given a fine discourse on the conformity between the pagan and popish ceremonies, which he exemplifies in the use of incense, holy water, lamps, and candles, before the shrines of saints, votive gifts or offerings round the shrines of the deceased, &c. In effect the altars; images, crosses, processions, miracles, and legends; nay, even the very hierarchy, pontificate, religious orders, &c. of the present

Cerebrum
||
Ceremony.

Ceremonies sent Romans, he shews are all copied from their heathen ancestors.—We have an ample and magnificent account of the religious ceremonies and customs of all nations the world, represented in figures designed by Picart, with historical explanations, and many curious dissertations.

Master of the CEREMONIES, an officer instituted by King James I. for the more honourable reception of ambassadors and strangers of quality. He wears about his neck a chain of gold, with a medal under the crown of Great Britain, having on one side an emblem of peace, with this motto, *beatæ pacifici*; and on the other, an emblem of war, with *Deum et non dicitur*: his salary is 300 l. per annum.

Assistant Master of the CEREMONIES, is to execute the employment in all points, whenever the master of the ceremonies is absent. His salary is 141 l. 13 s. and 4 d. per annum.

Marshal of the CEREMONIES is their officer, being subordinate to them both. His salary is 100 l. per annum.

CERENZA, a town of Italy in the kingdom of Naples, and in the Hither Calabria, with a bishop's see. It is seated on a rock in E. Long. 17. 5. N. Lat. 39. 23.

CERES, a Pagan deity, the inventor or goddess of corn; in like manner as Bacchus was of wine.

According to the poets, she was the daughter of Saturn and Ops, and the mother of Proserpine, whom she had by Jupiter. Pluto having stolen away Proserpine, Ceres travelled all over the world in quest of her daughter, by the help of a torch, which she had lighted in Mount Ætna.

As Ceres was thus travelling in search of her daughter, she came to Celesus king of Eleusis, and undertook to bring up his infant son Triptolemus. Being desirous to render her charge immortal, she fed him in the day-time with divine milk, and in the night covered him with fire. Celesus observing an unusual improvement in his son, resolved to watch his nurse, to which end he hid himself in that part of the house where she used to cover the child with fire; but when he saw her put the infant under the embers, he cried out and discovered himself. Ceres punished the curiosity and indiscretion of the father with death. Afterwards she taught the youth the art of sowing corn and other fruits, and mounted him in a chariot drawn by winged dragons, that he might traverse the world, and teach mankind the use of corn and fruits. After this, having discovered, by means of the nymph Arethusa, that Proserpine was in the infernal regions, she applied to Jupiter, and obtained of him that Proserpine should be restored, on condition that she had tasted nothing during her stay in that place: but it being discovered, by the information of Alcaphus, that, as she was walking in Pluto's orchard, she had gathered an apple, and had tasted of some of the seeds, he was for ever forbidden to return. Ceres, out of revenge, turned Alcaphus into an owl. At length, Jupiter, to mitigate her grief, permitted that Proserpine should pass one half of the year in the infernal regions with Pluto, and the other half with her mother on earth.

Cicero speaks of a temple of Ceres at Catania in Sicily, where was a very ancient statue of that goddess,

but entirely concealed from the sight of men, every thing being performed by matrons and virgins.

CERET, a town of France in Roussillon, with a magnificent bridge of a single arch. It is seated near the river Tec, in E. Long. 2. 46. N. Lat. 42. 23.

CEREUS, in botany. See **CACTUS**.

CERIGO, an island in the Archipelago, anciently called Cythera; noted for being the birth place of Helen, and, as the poets say, of Venus. At present, there is nothing very delightful in the place; for the country is mountainous, and the soil dry. It abounds in hares, quails, turtle, and excellent falcons. It is about 50 miles in circumference, and had formerly good towns; but there is now none remaining but that which gives name to the island. This is strong both by art and nature, it being seated on a craggy rock. The inhabitants are Christian Greeks, and subject to the Venetians, who keep a governor there, whom they change every two years.

CERINES, a town in the island of Cyprus, with a good castle, an harbour, and a bishop's see. E. Long. 33. 35. N. Lat. 35. 22.

CERINTHE, **HONEYWORT**; a genus of the monogynia order, belonging to the pentandria class of plants. There are three species, natives of Germany, Italy, and the Alps. They are low annual plants with purple, yellow and red flowers, which may be propagated by seed sown in autumn, in a warm situation.

CERINTHIANS, ancient heretics, who denied the deity of Jesus Christ.—They took their name from Cerinthus, one of the first heresiarchs in the church, being cotemporary with St John. See **CERINTHUS**.

They believed that Jesus Christ was a mere man, born of Joseph and Mary: but that, in his baptism, a celestial virtue descended on him in form of a dove; by means whereof he was consecrated by the holy spirit, and made Christ. It was by means of this celestial virtue, therefore, that he wrought so many miracles; which, as he received it from heaven, quitted him after his passion, and returned to the place whence it came: so that Jesus, whom they called a *pure man*, really died and rose again; but that Christ, who was distinguished from Jesus, did not suffer at all. It was partly to refute this sect, that St John wrote his gospel. They received the gospel of St Matthew, to countenance their doctrine of circumcision, from Christ's being circumcised; but they omitted the genealogy. They discarded the epistles of St Paul, because that apostle held circumcision abolished.

CERINTHUS, a heresiarch, cotemporary with the apostles, ascribed the creation not to God, but to angels. He taught that Jesus Christ was the son of Joseph, and that circumcision ought to be retained under the gospel. He is looked upon as the head of the converted Jews, who raised in the church of Antioch the tumult of which St Luke has given the history in the 15th chapter of the Acts. Some authors ascribe the book of the apocalypse to Cerinthus; adding, that he put it off under the name of St John, the better to authorize his reveries touching Christ's reign upon earth: and it is even certain that he published some works of this kind under the title of *Apocalypse*. See **APOCALYPSE**.

Ceret
Cerinthus.

Certhia
|
Certiorari.

CERTHIA, in ornithology, the **CREEPER** or **OX-EYE**, a genus belonging to the order of picæ. The beak of this genus is arched, slender, sharp, and triangular; the tongue is sharp at the point; and the feet are of the walking kind, *i. e.* having the toes open and unconnected. There are 25 species, of which only the *familiaris*, or common ox-eye, is a native of Britain. It is grey above, and white underneath, with brown wings and ten white spots on the ten prime feathers. It creeps up trees; lays about 20 eggs; and feeds upon caterpillars, and the eggs of insects.

CERTIFICATE (*Trial by*), in the law of England, a species of trial allowed in such cases where the evidence of the person certifying is the only proper criterion of the point in dispute *. For when the fact in question lies out of the cognizance of the court, the judges must rely on the solemn averment or information of persons in such a situation as affords them the most clear and competent knowledge of the truth. As therefore such evidence, if given to a jury, must have been conclusive, the law, to save trouble and circuitry, permits the fact to be determined upon such certificate merely. Thus, 1. If the issue be whether A was absent with the king in his army out of the realm in time of war, this shall be tried by the certificate of the marshal of the king's host in writing under his seal, which shall be sent to the justices. 2. If, in order to avoid an outlawry, or the like, it was alleged that the defendant was in prison, *ultra mare*, at Bourdeaux, or in the service of the mayor of Bourdeaux, this should have been tried by the certificate of the mayor; and the like of the captain of Calais. But when this was law, those towns were under the dominion of the crown of England. And therefore, by a parity of reason, it should now hold, that in similar cases arising at Jamaica or Minorca, the trial should be by certificate from the governor of those islands. We also find that the certificate of the queen's messenger, sent to summon home a peeress of the realm, was formerly held a sufficient trial of the contempt in refusing to obey such summons. 3. For matters within the realm; the customs of the city of London shall be tried by the certificate of the mayor and aldermen, certified by the mouth of their recorder; upon a surname from the party alleging it, that the custom ought to be thus tried: else it must be tried by the country. As, the custom of distributing the effects of freemen deceased; of enrolling apprentices; or that he who is free of one trade may use another; if any of these, or other similar points come in issue. 4. The trial of all customs and practice of the courts shall be by certificate from the proper officers of those courts respectively; and what return was made on a writ by the sheriff or under-sheriff, shall be only tried by his own certificate.

CERTIORARI, in law, a writ which issues out of the chancery, directed to an inferior court, to call up the records of a cause there depending, in order that justice may be done. And this writ is obtained upon complaint, that the party who seeks it has received hard usage, or is not like to have an impartial trial in the inferior court. A certiorari is made returnable either in the king's bench, common pleas, or in chancery.

It is not only issued out of the court of chancery,

but likewise out of the king's bench, in which last mentioned court it lies where the king would be certified of a record. Indictments from inferior courts, and proceedings of the quarter-sessions of the peace, may also be removed into the king's bench by a certiorari: and here the very record must be returned, and not a transcript of it; though usually in chancery, if a certiorari be returnable there, it removes only the tenor of the record.

CERTITUDE, considered in the things or ideas which are the objects of our understanding, is a necessary agreement or disagreement of one part of our knowledge with another: as applied to the mind, it is the perception of such agreement or disagreement; or such a firm well-grounded assent, as excludes not only all manner of doubt, but all conceivable possibility of a mistake.

There are three sorts of certitude, or assurance, according to the different natures and circumstances of things.

1. A physical or natural certitude, which depends upon the evidence of sense; as that I see such or such a colour, or hear such or such a sound; no body questions the truth of this, where the organs, the medium, and the object, are rightly disposed. 2. Mathematical certitude is that arising from mathematical evidence; such is, that the three angles of a triangle are equal to two right ones. 3. Moral certitude is that founded on moral evidence, and is frequently equivalent to a mathematical one; as that there was formerly such an emperor as Julius Cæsar, and that he wrote the commentaries which pass under his name; because the historians of these times have recorded it, and no man has ever disproved it since: this affords a moral certitude, in common sense so great, that one would be thought a fool or a madman for denying it.

CERTOSA, a celebrated Carthusian monastery, in the territory of the Pavese, in the duchy of Milan, four miles from Pavia; its park is surrounded with a wall 20 miles in circumference; but there are several small towns and villages therein.

CERVANTES. See **SAAVEDRA**.

CERVERA, a town of Spain in Catalonia, seated on a small river of the same name, in E. Long. 1. 9. N. Lat. 41. 28.

CERVIA, a sea-port town of Italy, in Romagna, with a bishop's see, seated on the gulph of Venice, in E. Long. 13. 5. N. Lat. 44. 16.

CERUSS, **WHITE-LEAD**, a sort of calx of lead, made by exposing plates of that metal to the vapour of vinegar. See **CHEMISTRY**, n° 281.

Ceruls, as a medicine, is used externally either mixed in ointments, or by sprinkling it on old glecting and watery ulcers, and in many diseases of the skin. If, when it is reduced into a fine powder, it is received in with the breath in inspiration, and carried down into the lungs, it causes terrible asthma, that are almost incurable, and at last generally prove fatal: sad instances of the very pernicious effects of this metal are too often seen among those persons who work lead in any form, but particularly among the workers in white-lead.

The painters use it in great quantities; and that it may be afforded cheap to them, it is generally adulterated

Certitude
|
Ceruls.

* See *Trial*.

Blackb.
Comment.

rated with common whiting : the English and Dutch cerufs are very bad in this respect : the Venetian ought always to be used by apothecaries.

CERVUS of *Antimony*. See PHARMACY, n° 777.

CERVUS, or DEER, in zoology, a genus of quadrupeds belonging to the order of pecora. The horns are solid, brittle, covered with a hairy skin, and growing from the top ; they likewise fall off and are renewed annually. There are eight fore-teeth in the under jaw, and they have no dog-teeth. The species of this genus enumerated by Linnæus are seven, viz.

1. The Camelopardalis, or Giraffe, with simple or unbranched horns, and the fore-feet remarkably longer than the hind-feet. This is an uncommon animal, few of them having ever been seen in Europe. It is a native of Ethiopia, and is very mild and gentle : the head is like that of a stag ; its horns are blunt and about six inches long. The neck resembles that of a camel, but is much longer, being sometimes seven feet in length. The body is small, covered with white hair, and spotted with red. He is 18 feet in length from the tail to the top of the head ; and when he holds up his head, it is 16 feet from the ground. He feeds principally on the leaves of trees : for, from the strange length of his fore-legs, he cannot graze, without dividing them to a vast distance. He kneels like a camel, when he would lie down.

2. The Alces, or Elk, has palmated horns, without any proper stem, and a fleshy protuberance on the throat. The neck is much shorter than the head, with a short, thick, upright mane, of a light brown colour. The eyes are small ; the ears a foot long, very broad and fouching ; nostrils very large ; the upper lip square, hangs greatly over the lower, and has a deep sulcus in the middle, so as to appear almost bifid. This is the largest animal of the deer kind. At the fair of St Germain at Paris, in the year 1752, a female elk was exhibited as a show. It was caught in the year 1749, in a forest of Red Russia, belonging to a khan of Tartary. The height was six feet seven inches, the length ten feet, and the thickness eight. The hair was long, like that of a wild boar. The elk is a very swift animal ; and he feeds upon leaves of alder, birch, willow, &c. When tamed, he devours large quantities of hay or bread. This animal is found in the northern parts of Europe, Asia, and America. They live amidst the forests for the conveniency of browsing the boughs of trees ; for the great length of their legs, and the shortness of their neck, prevent them from grazing with any sort of ease. They often feed on water-plants, which they can readily get at by wading, and M. Sarrafin says, they are so fond of the *anagris fetida*, or stinking bean-trefoil, as to dig for it with their feet, when covered with snow. They have a singular gait ; their pace is a high shambling trot, but they go with vast swiftness. In old times these animals were made use of in Sweden to draw sledges ; but as they were frequently accessory to the escape of murderers and other great criminals, the use was prohibited under very severe penalties. In passing through thick woods they carry their heads horizontally, to prevent their horns being entangled in the branches. In their common walk they raise their fore-feet very high ; and will with great ease

step over a rail a yard in height. They are inoffensive animals except when wounded, or in the rutting season, when they become very furious, and at that time swim from ille to ille in pursuit of the females. They strike with both horns and hoofs ; are hunted in Canada during winter, when they sink so deep in the snow, as to become an easy prey. The flesh is much commended for being light and nourishing, but the nose is accounted the greatest delicacy in all Canada : the tongues are much esteemed, and are frequently brought here from Russia ; the skin makes excellent buff-leather ; Linnæus says, it will turn a mullet-ball : the hair which is on the neck, withers, and lams of the full grown elk, is used in making mattresses. It is very long, and very elastic. The hoofs were supposed to have great virtues in curing the epilepsy. It was pretended that the elk being subject to that disease, cured itself by scratching its ear with its hoof. The elk was known to the Romans by the name of *Alce* and *Machlis* : they believed that it had no joints in its legs ; and, from the great size of the upper lip, imagined it could not feed without going backward as it grazed.

3. The Elaphus, or Stag, with long cylindrical ramified horns bent backwards. The colour of the stag is generally a reddish brown with some black about the face, and a black list down the hind part of the neck and between the shoulders. This animal is common to Europe, Barbary, the north of Asia, and America. Lives in herds : one male generally supreme in each herd. Furious and dangerous in rutting-time : seeks the female with a violent braying. Rutting season in August. Begins to shed its horns the latter end of February, or beginning of March : recovers them entirely by July. Foud of the sound of the pipe ; will stand and listen attentively. The account of the *cervina fenestus*, or vast longevity of the stag, is fabulous. Hinds go with young above eight months ; bring one at a time, seldom two ; secure the young from the stag, who would destroy it. Flesh of these animals coarse and rank ; skin useful for many purposes. The horns give name to the common volatile alkaline spirits sold in the shops for smelling to.

In Britain the stag is become less common than formerly ; its excessive vicinouness during the rutting season, and the badness of its flesh, induce most people to part with the species. Stags are still found wild in the Highlands of Scotland, in herds of four or five hundred together, ranging at full liberty over the vast hills of the north. Formerly the great Highland chieftains used to hunt with the magnificence of an eastern monarch, assembling four or five thousand of their clan, who drove the deer into the toils, or to the stations the lairds had placed themselves in : but as this pretence was frequently used to collect their vassals for rebellious purposes, an act was passed prohibiting any assemblies of this nature. Stags are likewise met with on the moors that border on Cornwall and Devonshire ; and in Ireland on the mountains of Kerry, where they add greatly to the magnificence of the romantic scenery of the lake of Killarney. The stags of Ireland during its uncultivated state, and while it remained an almost boundless tract of forest, had an exact agreement in habit with those that range at present through

Cervus. the wilds of America. They were less in body, but very fat; and their horns of a size far superior to those of Europe, but in form agreed in all points.

4. The Tarandus, or Rein-deer, is a native of Lapland, and the northern parts of Europe, Asia, and America. The horns are large, cylindrical, branched, and palmated at the tops. Two of the branches hang over the face. He is about the size of a buck, of a dirty whitish colour; the hairs of his skin are thick and strong*. To the Laplanders this animal is the substitute of the horse, the cow, the goat, and the sheep; and is their only wealth: the milk affords them cheese; the flesh, food; the skin, clothing; the tendons, bow-strings; and when split, thread; the horns, glue; the bones, spoons. During the winter it supplies the want of a horse, and draws their sledges with amazing swiftness over the frozen lakes and rivers, or over the snow, which at that time covers the whole country. A rich Laplander is possessed of a herd of 100 rein-deer. In autumn they seek the highest hills, to avoid the Lapland gad-fly, which at that time deposits its eggs in their skin; it is the pest of these animals, and numbers die that are thus visited. The moment a single fly appears, the whole herd instantly perceives it; they fling up their heads, toss about their horns, and at once attempt to fly for shelter amidst the snows of the loftiest Alps. In summer they feed on several plants; but during winter on the rein-liverwort, which lies far beneath the snow, which they remove with their feet and palmated brow antlers, in order to get at their beloved food. They live only 16 years.

5. The Dama, Fallow-deer, or Buck and Doe; with horns branched, compressed, and palmated at the top†. The colour of this deer is various; reddish, deep brown, white, or spotted. Not so universal as the stag; rare in France and Germany. Found in Greece, the Holy Land, and the north of China. In great abundance in England; but, except on a few chases, confined in parks. None originally in America. They are easily tamed; and their flesh, which goes by the name of venison, is in high esteem among the luxurious: during rutting-time they will contest with each other for their mistresses, but are less fierce than the stag; during that season, the male will form a hole in the ground, make the female lie down in it, and then often walk round and smell at her. Moore speaks of a species found on the banks of the Gambia, in the interior parts of Africa, near Barracunda, called *Toncong*, which he says differed not in form from the English fallow-deer; only that its size was equal to that of a small horse, and weighed 300 lb. It had also on its neck an erect black mane, four or five inches long.

6. The Capreolus, or Roe-buck; has erect, cylindrical, branched horns, and forked at the top. The roe-buck is the least of the deer kind; being only three feet nine inches long, two feet three inches high before, and two feet seven inches high behind; weight from 50 to 60 lb. Its make is very elegant, and formed for agility. They prefer a mountainous woody country to a plain one. They were formerly very common in Wales, in the north of England, and in Scotland; but at present the species nowhere exists in

Great Britain, except in the Scottish highlands. In France they are more frequent; they are also found in Italy, Sweden, and Norway; and in Asia they are met with in Siberia. The first that are met with in Great Britain are in the woods on the south-side of Loch-Rannoch, in Perthshire: the last in those of Longwal, on the southern borders of Caithness; but they are most numerous in the beautiful forests of Invercauld, in the midst of the Grampian hills. They are unknown in Ireland. These animals do not keep in herds like other deer, but only in families; they bring two fawns at a time, which the female is obliged to conceal from the buck while they are very young. The flesh of this creature is reckoned a very delicate food. Wild roes, during summer, feed on grass; and are very fond of the *rubus saxatilis*, called in the Highlands the roe-buck berry; but in the winter-time, when the ground is covered with snow, they browse on the tender branches of the fir and birch.

7. The Guineensis, about the size of a cat, is of a greyish colour, and black underneath. It is a native of Guinea, and the size and figure of its horns have not been hitherto described with any precision.

Cervus Volans, in natural history, a name given by authors to the stag-fly, or horned beetle, a very large species of beetle with horns sloped, and something like those of the stag.

CESARE, among logicians, one of the modes of the second figure of syllogisms; the minor proposition of which is an universal affirmative, and the other two universal negatives: thus,

CE No immoral books ought to be read.

SA But every obscene book is immoral;

RE Therefore no obscene books ought to be read.

CESENA, a town of Romagna in Italy, with a bishop's see, subject to the pope, and seated on the river Savio, in E. Long. 12. 46. N. Lat. 44. 8.

CESPITOSÆ PLANTÆ, (from *cespes*, turf or sod,) are those plants which produce many stems from one root, and thence form a close thick carpet on the surface of the earth.

CESPITOSÆ *Paludes*, turf-bogs.

CESSATION, the act of intermitting, discontinuing, or interrupting the course of any thing, work, action, or the like.

CESSATION of Arms, an armistice, or occasional truce. See TRUCE.

When the commander of a place finds things reduced to an extremity, so that he must either surrender, or sacrifice the garrison and inhabitants to the mercy of the enemy, he plants a white flag on the breach, or beats the chamade; on which a cessation of arms and hostilities commences, to give room for a capitulation.

CESSIO BONORUM, in Scots law, the name of that action by which an insolvent debtor may apply for liberation from prison, upon making over his whole real and personal estate to his creditors.

CESSION, in law, an act by which a person surrenders and transmits to another person, a right which belonged to himself. Cession is more particularly used in the civil law for a voluntary surrender of a person's effects to his creditors, to avoid imprisonment. See the article BANKRUPT.

Cervus
1
Cession.

* See Plate
LXXV.
fig. 4.

† See Plate
LXXIV.

CAPRA HIRCUS,
or Common Goat.



CERVUS DAMA,
or Buck.



Condenser



Chiton



CAPRIMULGUS,
or Goat Sucker.

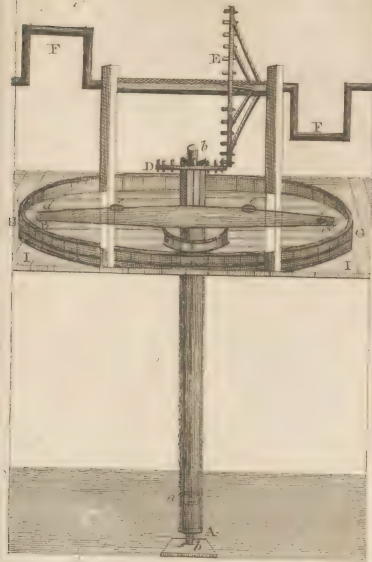


Chiton



Fig. 3. CENTRIFUGAL Machine.

Fig. 2. CEDAR, *Nahegon*
or, *Nahegonny* Tree.



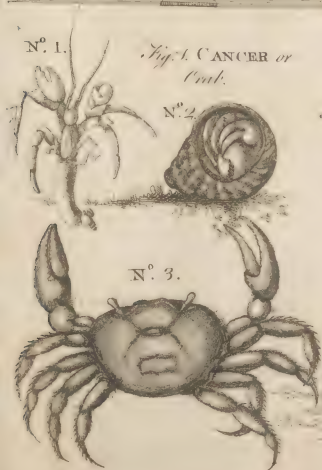
N^o. 1.

Fig. 1. CANCER or
Crab.

N^o. 2.

Fig. 4. CERVUS, *Tarandus*
or *Rand* Deer.

N^o. 3.



Ceffion
|
Celtus.

In several places the cession carried with it a mark of infamy, and obliged the person to wear a green cap or bonnet; at Lucca, an orange one: to neglect this was to forfeit the privileges of the *cession*. This was originally intended to signify that the cessionary was become poor through his own folly. The Italian lawyers describe the ceremony of cession to consist in striking the bare breech three times against a stone, called *Lapis Vituperii*, in presence of the judge. Formerly it consisted in giving up the girdles and keys in court; the ancients using to carry at their girdles the chief utensils wherewith they got their living; as the scrivener his *escritoire*, the merchant his bag, &c. The form of cession among the ancient Gauls and Romans was as follows. The cessionary gathered up dust in his left hand from the four corners of the house, and standing on the threshold, holding the door-post in his right hand, threw the dust back over his shoulders; then stripping to his shirt, and quitting his girdle and bags, he jumped with a pole over a hedge; hereby letting the world know, that he had nothing left, and that when he jumped all he was worth was in the air with him. This was the cession in criminal matters. In civil cases, it was sufficient to lay a broom, a switch, or a broken straw, on the threshold: this was called *chrenscruda per durpillum et fessucam*.

CESSION, in the ecclesiastical law, is when an ecclesiastical person is created a bishop, or when a parson of a parish takes another benefice, without dispensation, or being otherwise qualified. In both these cases their first benefices became void by cession, without any resignation; and to those livings that the person had, who was created bishop, the king may present for that time, whosoever is patron of them; and in the other case the patron may present: but by dispensation of retainer, a bishop may retain some or all the preferments he was entitled to before he was made bishop.

CESTRUM, BASTARD JASMINE; a genus of the monogynia order, belonging to the pentandria class of plants. There are six species, all of them natives of the warmest parts of America; so cannot be preserved in this country without artificial heat. They are flowering shrubs, rising in height from five to twelve feet, with flowers of a white, herbaceous, or pale yellow colour. The flowers of one species commonly called *Badington Jaspine*, have the property of sending out a strong scent after sunset. They may be propagated either by seeds or cuttings.

CESTUI, a French word, signifying *he or him*, frequently used in the English law writings. Thus, *Cestui qui trust*, a person who has lands, &c. committed to him for the benefit of another; and if such person does not perform his trust, he is compellable to it in chancery. *Cestui qui vie*, one for whose life any lands, &c. are granted. *Cestui qui use*, a person to whose use any one is infeoffed of lands or tenements. Formerly the feelees to uses were deemed owners of the land, but now the possession is adjudged in *cestui qui use*.

CESTUS, among ancient poets, a fine embroidered girdle said to be worn by Venus, to which Homer ascribes the power of charming and conciliating love.

CETACEOUS, an appellation given to the fishes of the whale kind; the characters of which are: they have no gills; there is an orifice on the top of the head, through which they breathe and eject water; and they have a flat or horizontal tail.

Nature on this tribe hath bestowed an internal structure, in all respects agreeing with that of quadrupeds; and in a few others the external parts in both are similar. Cetaceous fish, like land animals, breathe by means of lungs, being destitute of gills. This obliges them to rise frequently to the surface of the water to respire, to sleep on the surface, as well as to perform several other functions. They have the power of uttering sounds, such as bellowing and making other noises denied to genuine fish. Like land animals they have warm blood, are furnished with organs of generation, copulate, bring forth, and suckle their young, shewing a strong attachment to them. Their bodies beneath the skin are entirely surrounded with a thick layer of fat (blubber), analogous to the lard on hogs. The number of their fins never exceeds three, *viz.* two pectoral fins, and one back fin; but in some species the last is wanting. Their tails are placed horizontally, or flat in respect to their bodies; contrary to the direction of those of all other fish which have them in a perpendicular site. This situation of the tail enables them to force themselves suddenly to the surface of the water to breathe, which they are so frequently constrained to do. Many of these circumstances induced Linnæus to place this tribe among his *mammalia*, or what other writers call quadrupeds*. To have preserved the chain of beings * See Zoology, he should in this case have made the genus of *giz*, n° 7. *giz* *phoca* or *seals*, and that of the *trichechus* or *manati*, immediately precede the whale, those being the links that connect the *mammalia* or quadrupeds with the fish: for the seal is, in respect to its legs, the most imperfect of the former class; and in the *manati* the hind feet coalesce, assuming the form of a broad horizontal tail.

Notwithstanding the many parts and properties which cetaceous fish have in common with land animals, yet there still remain others which render it more natural to place them, with Ray, in the rank of fish: the form of their bodies agrees with that of fish; they are entirely naked, or covered only with a smooth skin; they live constantly in the water, and have all the actions of fish.

CETE, the name of Linnæus's seventh order of *mammalia*, comprehending the *MONODON*, *BALÆNA*, *PHYSETER*, and *DELPHINUS*.

CETERACH, in botany, the trivial name of a species of *ASPLENIUM*.

CETTE, a maritime town of France, in Languedoc, seated at the place where the canal of Languedoc begins, between Montpellier and Agde, on the bay of Maguelona in the Mediterranean sea. E. Long. 3. 15. N. Lat. 43. 25.

CETUS, in astronomy, the whale; a large constellation of the southern hemisphere, under Pisces, and next the water of Aquarius. See ASTRONOMY, n° 206.

Cetus is represented by the poets, as the sea-monster which Neptune, at the suit of the nymphs, sent to devour Andromeda for the pride of her mother, and which

Cetaceous.
|
Cetus.

Ceva
|
Ceylon.

which was killed by Perseus. In the mandible of cetus is a variable star which appears and disappears periodically, passing through the several degrees of magnitude both increasing and diminishing, in about 333 days. See ASTRONOMY, n° 9.

CEVA, a strong town of Piedmont in Italy, seated on the river Tanero, with a strong fort, in E. Long. 8. 8. N. Lat. 44. 20.

CEVENNES, mountains of Languedoc in France, remarkable for the frequent meetings of the Protestants there as a place of security against the tyranny of their governors. In queen Anne's reign there was an attempt made to afflict them by an English fleet in the Mediterranean; but to no purpose, for the French had occupied the passages.

CEUTA, a maritime town of Barbary in Africa, and in the kingdom of Fez, seated on the straits of Gibraltar, opposite that place, in W. Long. 6. 25. N. Lat. 36. 35. John king of Portugal took it from the Moors in 1415, but it now belongs to Spain. In 1697, it sustained a vigorous siege by the Moors.

CEYLON, a large island in the East Indies, about 250 miles in length and 200 in breadth. The air is very good; the country full of mountains, but interspersed with fertile valleys; and it is remarkable for producing excellent cinnamon. In some places are rich mines of sapphires, rubies, topazes, and cats-eyes, besides other stones of less value. There is also plenty of wood for dyeing, and all other uses. The animals are cows, buffaloes, goats, hogs, tigers, monkeys, &c. They have large elephants, and monstrous serpents which are very dangerous. The island is also infested with ants, which do a great deal of mischief. It lies from E. Long. 78° to 82° and from N. Lat. 6° to 10°.

The conquest of this island was the first attempt of Albuquerque the celebrated Portuguese admiral. He found it well peopled, and inhabited by two different nations, the *Bedas* inhabiting the northern, and the *Cingalasses* who dwell in the southern parts. The former were very barbarous, but the latter a good deal more polished. Besides the advantages already mentioned, which these nations derived from their mines of precious stones, they carried on the greatest pearl-fishery in the East. These nations the Portuguese conquered, and tyrannized over in such a manner, that they afflicted the Dutch in expelling them from the island; and by their united efforts this was accomplished in 1658, after a bloody and obstinate war. All the Portuguese settlements fell into the hands of the Dutch East India company, who still keep possession of them, excepting a small district on the Eastern coast without any port, from whence the sovereign of the country had his salt. These settlements formed a regular track, extending from two to twelve leagues into the inland parts of the island. The company have appropriated all the productions of the island. The several articles of trade are, 1. Amethysts, sapphires, topazes, and rubies; the last are very small, and very indifferent. The Moors who come from the coast of Coromandel buy them, paying a moderate tax: and when they are cut, sell them at a low price in the different countries of India. 2. Pepper, which the company buy for about 4 d. *per* pound; coffee for which they only pay 2 d. and cardamom which has no

fixed price. These articles are all of an inferior quality, and through the indolence of the inhabitants will never turn to any account. 3. A hundred bales of handkerchiefs, pagnes, and gingham, of a fine red colour, which are fabricated by the Malabars at Jafnapatan. 4. A small quantity of ivory, and about 50 elephants, which are carried to the coast of Coromandel. 5. Areca, which the company buys at about 8 s. 9 d. the ammonian, and sells on the spot at L. 1, 13 s. to the merchants of Bengal, Coromandel, and the Maldives; who give in return rice, coarse linen, and cowries. 6. The pearl-fishery, which was formerly of great consequence; but is now so much exhausted as not to bring in more than L. 8,750 *per annum*. 7. After all, the great object of the company is cinnamon. They purchase the greatest part of their cinnamon of the Indians who are subject to them, and, all expences deducted, it does not cost them above 6 d. *per* pound. The annual expences of the colony may amount to about L. 96,250; their revenues and small branches of commerce produce only about L. 87,500. This deficiency must be supplied out of the profits arising from the cinnamon trade; and they are obliged to provide for the expences of the wars in which they are frequently engaged with the king of Candy, who is at present the sole sovereign of the island. These are very detrimental to the interests of the Hollanders; for which reason they endeavoured to engage the good will of this monarch by shewing him all imaginable civilities. The harmony, however, has been often interrupted. In a bloody war which terminated on the 14th of February 1766, the Ceylonese monarch was driven from his capital, so that the Dutch made a very advantageous treaty. Their sovereignty was acknowledged over all that part of the country they possessed before the troubles broke out; and that part of the coasts held by the natives was ceded to them. They were allowed to gather cinnamon in all the plains; and the court was to sell them the best sort which is produced in the mountains, at the rate of L. 1 : 16 : 1, for 18 *lb*. The government engaged to have no connection with any foreign power; and even to deliver up any Europeans who may happen to stray into the island. In return for so many concessions, the king was to receive annually the value of the produce of the ceded coasts; and from thence his subjects were to be furnished gratis with as much salt as they had occasion for. The Ceylonese are in the most miserable situation: they are in a state of total inactivity; live in huts without any furniture; and subsist upon fruits: those who are the most affluent have no other covering than a piece of coarse linen wrapt about their waist.

CHACE. See CHASE.

CHACO, a large country of South America situated between 19° and 37° S. Lat. It belongs to the Spaniards, by whom it was conquered in 1536. It is not naturally fruitful; but abounds in gold mines, which are so much the more valuable that they are easily worked. The works are carried on by about 8000 blacks, who deliver every day to their masters a certain quantity of gold; and what they can collect above this, belongs to themselves; as well as what they find on those days that are consecrated to religion and rest, upon

Ceylon
|
Chaco.

Chadchod
Chaffinch.

upon condition that during the festival they maintain themselves. This enables many of them to purchase their liberty; after which they intermarry with the Spaniards.

CHADCHOD, in Jewish antiquity. Ezekiel mentions *chadchod* among the several merchandizes which were brought to Tyre. The old interpreters, not very well knowing the meaning of this term, continued it in their translation. St Jerom acknowledges that he could not discover the interpretation of it. The Chaldee interprets it pearls; others think that the onyx, ruby, carbuncle, crystal, or diamond is meant by it.

CHÆROPHYLLUM, *CHERVIL*; a genus of the dignia order, belonging to the pentandria class of plants. There are seven species, two of which, called cow-weed, and wild chervil, are weeds common in many places of Britain. The roots of the first have been found poisonous when used as parsnips: the rundles afford an indifferent yellow dye; the leaves and stalks a beautiful green. Its preference indicates a fertile and grateful soil. It ought to be rooted out from all pastures early in the spring, as no animal but the ass will eat it. It is one of the most early plants in shooting, so that by the beginning of April the leaves are near two feet high. The leaves are recommended by Geoffroy as aperient and diuretic, and at the same time grateful to the palate and stomach. He even asserts, that dropsies which do not yield to this medicine can scarcely be cured by any other. He directs the juice to be given in the dose of three or four ounces every fourth hour, and continued for some time either alone, or in conjunction with nitre and syrup of the five opening roots.—The other species of *chærophyllum* are not possessed of any remarkable property.

CHÆTODON, in ichthyology, a genus of fishes belonging to the order of thioraci. The teeth are very numerous, thick, setaceous, and flexible; the rays of the gills are six. The back-fin and the fin at the anus are fleshy and squamous. There are 23 species, distinguished from each other principally by the figure of the tail, and the number of spines in the back-fin. The most remarkable is the rostratus, or shooting-fish, having a hollow, cylindrical beak. It is a native of the East Indies, where it frequents the sides of the sea and rivers in search of food, from its singular manner of obtaining which it receives its name. When it spies a fly sitting on the plants that grow in shallow water, it swims on to the distance of four, five, or six feet; and then, with a surprising dexterity, it ejects out of its tubular mouth a single drop of water, which never fails striking the fly into the water, where it soon becomes its prey.

CHAFERY, in the iron-works, the name of one of the two principal forges. The other is called the *finery*. When the iron has been brought at the finery into what is called an ancony, or square mass, hammered into a bar in its middle, but with its two ends rough, the business to be done at the chafery is the reducing the whole to the same shape, by hammering down these rough ends to the shape of the middle part.

CHAFFINCH, in ornithology, the English name of a species of FRINGILLA.

CHAGRE, a fort of America in the province of Darien at the mouth of a river of the same name. It has been taken several times by the bucaners, and last of all by Admiral Vernon in 1740. W. Long. 82. 7. N. Lat. 9. 50.

CHAIN, (*Gutena*), a series of several rings, or links, fitted into one another.

There are *chains* of divers matters, sizes, forms, and for divers uses.—Ports, rivers, streets, &c. are clothed with iron *chains*: rebellious cities are punished by taking away their *chains* and barriers.

The arms of the kingdom of Navarre are, *Chains Or, in a field Gules*. The occasion hereof is referred to the kings of Spain leagued against the Moors; who having gained a celebrated victory against them in 1212, in the distribution of the spoils the magnificent tent of Miralmunin fell to the king of Navarre, as being the first that broke and forced the *chains* thereof.

A *gold chain*, is one of the ornaments or badges of the dignity of the chief magistrates of a city, as the mayor of London, the provost and bailies of Edinburgh, &c.—Something like this obtained among the ancient Gauls: the principal ornament of their persons in power and authority was a gold *chain*, which they wore on all occasions; and even in battle, to distinguish them from the common soldiers.

CHAIN also denotes a kind of string, of twisted wire; serving to hang watches, tweezer-cases, and other valuable toys upon. The invention of this piece of curious work is owing to the English; whence, in foreign countries, it is denominated the *English chain*. These *chains* are usually either of silver or gold, some of gilt copper; the thread, or wire of each kind to be very fine.—For the fabric, or making of these *chains*: a part of the wire is folded into little links of an oval form; the longest diameter about three lines; the shortest, one. These, after they have been exactly folded, are again folded into two; and then bound together, or interwove, by means of several other little threads of the same thickness; some whereof, which pass from one end to the other, imitate the warp of a stuff; and the others, which pass tranverse, the woof. There are at least four thousand little links in a *chain* of four pendants; which are by this means bound so equally, and withal so firmly together, that the eye is deceived, and takes the whole to consist of one entire piece.

CHAIN is also a kind of measure in France, in the trade of wood for fuel. There are chains for wood by tale, for wood by the rope, for faggots, for cleft wood, and for round sticks. There are also chains for measuring the sheaves of all sorts of corn, particularly with regard to the payment of tithes; for measuring portles of hay, and for measuring horses. All these are divided into feet, inches, hands, &c. according to the use they are designed for.

CHAIN, in surveying, a measure of length, made of a certain number of links of iron-wire, serving to take the distance between two or more places.

Gunter's chain consists of 100 such links, each measuring $7\frac{1}{2}$ inches, and consequently equal to 66 feet, or four poles. See SURVEYING.

CHAIN-Pump. See PUMP.

CHAIN-Shot, two bullets with a chain between them.

Chain.
||
Chalcedony.
ny.

them. They are used at sea to shoot down yards or masts, and to cut the shrouds or rigging of a ship.

Top-CHAIN, on board a ship, a chain to sling the fail-yards in time of battle, in order to prevent them from falling down when the ropes by which they are hung happen to be shot away or rendered incapable of service.

CHAIN-WALES, or *Channels*, of a ship, *portebaisoirs*, are broad and thick planks projecting horizontally from the ship's outside, abreast of and somewhat behind the masts. They are formed to extend the shrouds from each other, and from the axis or middle line of the ship, so as to give a greater security and support to the masts, as well as to prevent the shrouds from damaging the gunwale, or being hurt by rubbing against it. Every mast has its chain-wales, which are either built above or below the second deck-ports in a ship of the line: they are strongly connected to the side by knees, bolts, and standards, besides being confined thereto by the chains whose upper ends pass through notches on the outer edge of the chain-wales, so as to unite with the shrouds above.

CHAINS, in ship-building, are strong links or plates of iron, the lower ends of which are bolted through the ship-side to the timbers.

CHAIN-Island, an island lately discovered by captain Wallis in the South-sea. It seemed to be about five miles long and as much broad, lying in the direction of north-west and south-east. It appeared to be a double range of woody islands joined together by reefs, so as to compose one island of an oval figure, with a lake in the middle. The trees are large; and from the smoke that issued from the woods, it appeared to be inhabited. V. Long. 145. 54. S. Lat. 17. 23.

CHAIR, (*Cathedra*), was anciently used for the pulpit, or fagellum, whence the priest spoke to the people. See *PULPIT*, and *CATHEDRA*.

It is still applied to the place whence professors and regents in universities deliver their lectures, and teach the sciences to their pupils: thus we say, the professor's chair, the doctor's chair, &c.

Curule CHAIR. See *CURULE*.

CHAIR is also applied by the Romanists to certain feasts, held anciently in commemoration of the translation of the fee or feat of the vicarage of Christ by St Peter.

The *perforated chair*, wherein the new-elected pope is placed, F. Mabillon observes, is still to be seen at Rome: but the origin thereof he does not attribute, as is commonly done, to the adventure of pope Joan; but says there is a mystery in it; and it is intended, forsooth, to explain to the pope those words of scripture, that *God draws the poor from out of the dust and mire*.

Marine CHAIR. See *MARINE CHAIR*.

CHAISE, a fort of light open chariot or calash.

See *CHARIOT*.

CHALAZA, among naturalists, a white knotty sort of string at each end of an egg, formed of a plexus of the fibres of the membranes, whereby the yolk and white are connected together. See *EGG*.

CHALCEDONY, in natural history, a genus of the semipellucid gems: they are of an even and regular, not tabulated structure; of a semi-opaque crystal-

line basis; and variegated with different colours, but those ever diffused in form of mists or clouds, and, if nicely examined, found to be owing to an admixture of various coloured earths, but imperfectly blended in the mists, and often visible in distinct molecules.—It has been doubted by some whether the ancients were at all acquainted with the stone we call *chalcedony*; they having described a Chalcedonian carbuncle and emerald, neither of which can at all agree with the characters of our stone; but we are to consider that they have also described a Chalcedonian jasper which seems to have been the very same stone, as they describe by the word *turbida*, which extremely well agrees with our *chalcedony*.

There are four known species of the *chalcedony*.

1. A bluish white one. This is the most common of all, and is found in the shape of our flints and pebbles, in masses of two or three inches or more in diameter: it is of a whitish colour, with a faint cloud of blue diffused all over it, but always in the greatest degree near the surface. This is a little less hard than the oriental onyx. The oriental chalcedonies are the only ones of any value; they are found in vast abundance on the shores of rivers in all parts of the East Indies, and frequently come over among the balaft of the East-India ships. They are common in Silesia and Bohemia, and other parts of Europe also; but with us are less hard, more opaque, and of very little value. 2. The dull milky-veined *chalcedony*. This is a stone of little value; and is sometimes met with among our lapidaries, who mistake it for a kind of nephritic stone. It is of a somewhat yellowish white or cream colour, with a few milk-white veins. This is principally found in New-Spain. 3. The third is a brownish, black, dull, and cloudy one, known to the ancients by the name of smoky jasper, or jaspis capnitis. This is the least beautiful stone of all the class; it is of a pale brownish white, clouded all over with a blackish mist, as the common *chalcedony* is with a blue. It is common both in the East and West Indies, and in Germany; but is very little valued, and is seldom worked into any thing better than the handles of knives. 4. The yellow and red *chalcedony* is greatly superior to all the rest in beauty; and is in great repute in Italy, though very little known among us. It is naturally composed of an admixture of red and yellow only, on a clouded crystalline basis; but is sometimes blended with the matter of common *chalcedony*, and then is mixed with blue. It is all over of the misty hue of the common *chalcedony*. This is found only in the East-Indies, and there not plentifully. The Italians make it into beads, and call these *castidones*; but they are not determinate in the use of the word, but call beads of several of the agates by the same name.—All the *chalcedonies* readily give fire with steel, and make no effervescence with aquafortis.

CHALCIDIUS, a famous platonic philosopher, in the third century, who wrote a commentary, which is esteemed, on the *Timæus* of Plato. This work has been translated from the Greek into Latin.

CHALCONDYLAS (*Demetrius*), a learned Greek, born at Constantinople, left that city after its being taken by the Turks, and afterwards taught Greek in several

Chalcidius
|
Chalcondylas.

Chalcondylas several cities in Italy. He composed a Greek grammar; and died at Milan in 1513.

CHALCONDYLAS (Laonicus), a famous Greek historian of the fifteenth century, was born at Athens; and wrote an excellent history of the Turks, from Ottoman, who reigned about the year 1300, to Mahomet II. in 1463.

CHALDÆA, or **BABYLONIA**, the name of an ancient kingdom of Asia, now called Eyrac Arabi. See **BABYLONIA**.

CHALDEE LANGUAGE, that spoken by the Chaldeans, or people of Chaldæa. It is a dialect of the HEBREW.

CHALDRON, a dry English measure, consisting of thirty-six bushels, heaped up according to the seal-bushel kept at Guild-hall, London: but on ship-board, twenty-one chaldron of coals are allowed to the score. The chaldron should weigh two thousand pounds.

CHALICE, the cup or vessel used to administer the wine in the sacrament; and by the Roman catholics in the mass.

The use of the chalice, or communicating in both kinds, is, by the church of Rome, denied to the laity, who communicate only in one kind, the clergy alone being allowed the privilege of communicating in both kinds.

CHALK, *Creta*, is a white earth found plentifully in Britain, France, Norway, and other parts of Europe; said to have been anciently dug chiefly in the island of Crete, and thence to have received its name of Creta. They have a very easy way of digging chalk in the county of Kent in England. It is there found on the sides of hills; and the workmen undermine it so far as appears proper; then digging a trench at the top as far distant from the edge as the undermining goes at bottom, they fill this with water, which soaks through in the space of a night, upon which the whole flake falls down at once. In other parts of the kingdom, chalk generally lies deeper, and they are forced to dig for it at considerable depths, and draw it up in buckets.

Chalk is of two kinds; hard, dry, and firm, or soft and unctuous; both of which are adapted to various purposes. The hard and dry kind is much the properest for burning into lime; but the soft and unctuous chalk is best for using as a manure for lands. Chalk, whether burnt into lime or not, is in some cases an excellent manure. Its mode of operating on the soil, is explained under the article **AGRICULTURE**, n° 21.

Pure chalk melts easily with alcali and flint into a transparent colourless glass. With alkaline salts it melts somewhat more difficultly; and with borax somewhat more easily than with flint or sand. It requires about half its weight of borax, and its whole weight of alcali, to fuse it. Sal mirabile, and sandiver, which do not vitrify at all with the crystalline earths, form, with half their weight of chalk, the first a yellowish black, the latter a greenish, glass. Nitre, on the other hand, one of the most active fluxes for flint, does not perfectly vitrify with chalk. This earth notably promotes the vitrification of flint; a mixture of the two requiring less alcali than either of them

separately. If glass made from flint and alcali is further saturated with the flint, so as to be incapable of bearing any further addition of that earth without becoming opaque and milky, it will still in a strong fire take up a considerable proportion, one-third or one-fourth of its weight of chalk, without injury to its transparency; hence chalk is sometimes made use of in compositions for glass, as a part of the salt may then be spared. Chalk likewise has a great effect in melting the stony matters intermixed with metallic ores, and hence might be of use in smelting ores; as indeed limestone is used for that purpose. But it is remarkable, that chalk, when deprived of its fixed air, and converted into limestone, loses much of its disposition to vitrify. It is then found to melt very difficultly and imperfectly, and to render the glass opaque and milky.

Chalk readily imbibes water; and hence masses of it are employed for drying precipitates, lakes, earthy powders that have been levigated with water and other moist preparations. Its economical uses in cleaning and polishing metalline or glass utensils are well known. In this case it is powdered and washed from any gritty matter it may contain, and is then called *whiting*. In medicine it is one of the most useful absorbents, and is to be looked upon simply as such: the astringent virtues which some have attributed to it have no foundation, unless in as far as the earth is saturated with an acid, with which it composes a saline concrete manifestly sub-astringent. For the further properties of chalk, see **CHEMISTRY**, n° 33, 127, 191, 234, 277, 342.

Black CHALK, a name given by painters to a species of earth with which they draw on blue paper, &c. It is found in the earth in pieces from two to ten feet long, and from four inches to 20 in breadth, generally flat, but somewhat rising in the middle, and thinner towards the edges, commonly lying in large quantities together. While in the earth, it is moist and flaky; but being dried, it becomes considerably hard and very light; but always breaks in some particular direction; and if attentively examined when fresh broken, appears of a striated texture. To the touch it is soft and smooth, stains very freely, and by virtue of its smoothness makes very neat marks. It is easily reduced into an impalpable soft powder, without any diminution of its blackness: In this state it mixes easily with oil into a smooth paste; and being diffused through water, it slowly settles in a black slimy or muddy form; properties which make its use very convenient to the painters both in oil and water colours. It appears to be an earth quite different from common chalk, and rather of the slaty bituminous kind. In the fire it becomes white with a reddish cast, and very friable, retaining its flaky structure, and looking much like the white flaky masses which some sorts of pit-coal leave in burning. Neither the chalk nor these allies are at all affected by acids.

The colour-shops are supplied with this earth from Italy or Germany; though some parts of England afford substances nearly, if not entirely, of the same quality, and which are found to be equally serviceable both for marking and as black paints. Such particularly is the black earth called *killow*, said by Dr Merret

Chalk in his *Pinax Rerum Britannicarum*, to be found in Lancashire; and by Mr Da Costa, in his history of fossils, to be plentiful on the side near the top of Cay-Avon, an high hill in Merioneth-shire.

Challenge.

Red Chalk, an earth much used by painters and artificers, and common in the colour-shops. It is properly an indurated clayey ochre; and is dug in Germany, Italy, Spain, and France, but in greatest quantity in Flanders. It is of a fine, even, and firm texture; very heavy, and very hard; of a pale red on the outside, but of a deep dusky chocolate colour within. It adheres firmly to the tongue, is perfectly insipid to the taste, and makes no effervescence with acids.

Chalk-Land. Barley and wheat will succeed very well on the better sort of chalky land, and oats generally do well on any kind of it. The natural produce of this sort of land in weeds, is that sort of small vetch called the *tine-tare*, with poppies, may-weed, &c. Saint-foin and hop-clover will generally succeed tolerably well on these lands; and, where they are of the better sort, the great clover will do. The best manure is dung, old rags, and the sheep-dung left after folding them on it.

Chalk-Stones, in medicine, signify the concretions of calcareous matter in the hands and feet of people violently afflicted with the gout. Lewenhoeck has been at the pains of examining these by the microscope. He divides them into three parts. The first is composed of various small parcels of matter looking like white grains of sand; this is harder and drier, and also whiter, than the rest. When examined with large magnifiers, these are found to be composed of oblong particles laid closely and evenly together; though the whole small stones are opaque, these component parts of them are pellucid, and resemble pieces of horse-hair cut short, only that they are somewhat pointed at both ends. These are so extremely thin, that Mr Lewenhoeck computes that 1000 of them placed together would not amount to the size of one hair of our heads. The whole stones in this harder part of the chalk are not composed of these particles, but there are confusedly thrown in among them some broken parts of other substances, and in a few places some globules of blood and small remains of other juices. The second kind of chalky matter is less hard and less white than the former, and is composed of fragments or irregular parts of those oblong bodies which compose the first or hardest kind, and these are mixed among tough and clear matter, interspersed with the small broken globules of blood discoverable in the former, but in much greater quantity. The third kind appears red to the naked eye; and, when examined with glasses, is found to be a more tough and clammy white matter, in which a great number of globules of blood are interspersed; these give it the red appearance it has.

CHALLENGE, a cartel or invitation to a duel or other combat*. A challenge either by word or letter, or to be the bearer of such challenge, is punishable by fine and imprisonment on indictment or information.

CHALLENGE, among hunters. When hounds or beagles, at first finding the scent of their game, presently open and cry, they are said to challenge.

CHALLENGE, in the law of England, is an exception made to jurors*; and is either in civil or criminal cases.

Challenge.

* See the article Trial.

I. In civil cases challenges are of two sorts; challenges to the array, and challenges to the poll.

I. Challenges to the array are at once an exception *Blackstone's* to the whole panel, in which the jury are arrayed, or *Comment.*

set in order by the sheriff in his return; and they may be made upon account of partiality or some default in the sheriff or his under officer who arrayed the panel. Also, though there be no personal objection against the sheriff, yet if he arrays the panel at the nomination, or under the direction of either party, this is good cause of challenge to the array. Formerly if a lord of parliament had a cause to be tried, and no knight was returned upon the jury, it was a cause of challenge to the array: also by the policy of the ancient law, the jury was to come *de vicineto*, from the neighbourhood of the vill or place where the cause of action was laid in the declaration: and therefore some of the jury were obliged to be returned from the hundred in which such vill lay; and, if none were returned, the array might be challenged from defect of hundreders. For, living in the neighbourhood, these were supposed to know beforehand the characters of the parties and witnesses; and therefore they better knew what credit to give to the facts alleged in evidence. But this convenience was overbalanced by another very natural and almost unavoidable inconvenience; that jurors coming out of the immediate neighbourhood, would be apt to intermix their prejudices and partialities in the trial of right. And this the law was so sensible of, that it for a long time has been gradually relinquishing this practice; the number of necessary hundreders in the whole panel, which in the reign of Edward III. were constantly six, being in the time of Fortescue reduced to four; afterwards by statute 27 Eliz. c. 6. to two; and at length, by statute 4 and 5 Anne, c. 16. it was entirely abolished upon all civil actions, except upon penal statutes; and upon those also by the 24 Geo. II c. 18. the jury being now only to come *de corpore communitatis*, from the body of the county at large, and not *de vicineto*, or from the particular neighbourhood. The array by the ancient law may also be challenged, if an alien be party to the suit, and, upon a rule obtained by his motion to the court for a jury *de medietate lingue*, such a one be not returned by the sheriff pursuant to the statute 25 Edward III. c. 13. enforced by 8 Hen. VI. c. 29. which enact, that where either party is an alien born, the jury shall be one half denizens and the other aliens, (if so many be forthcoming in the place), for the more impartial trial: A privilege indulged to strangers in no other country in the world; but which is as ancient in England as the time of king Ethelred, in whose statute *de monticulis Wallie*, (then aliens to the crown of England) c. 3. it is ordained, that "duodeni legales homines, quorum sex Walli et sex Angli erunt, Anglis et Wallis jus dicunt."

2. Challenges to the polls, *in capita*, are exceptions to particular jurors; and seem to answer the *recusatio judicis* in the civil and canon laws; by the constitutions of which, a judge might be refused upon any suspicion.

Challenge.

spicion of partiality. By the laws of England also, in the times of Bracon and Fleta, a judge might be refused for good cause; but now the law is otherwise, and it is held that judges or justices cannot be challenged. For the law will not suppose a possibility of bias or favour in a judge who is already sworn to administer impartial justice, and whose authority greatly depends on that presumption and idea. And, should the fact at any time prove flagrantly such, as the delicacy of the law will not presume beforehand, there is no doubt but that such misbehaviour would draw down a heavy censure from those to whom the judge is accountable for his conduct. But challenges to the polls of the jury (who are judges of fact) are reduced to four heads by Sir Edward Coke: *propter honoris respectum; propter defectum; propter affectum; and propter delictum*. 1. *Propter honoris respectum*; as, if a lord of parliament be impanelled on a jury, he may be challenged by either party, or he may challenge himself. 2. *Propter defectum*; as, if a jurymen be an alien born, this is defect of birth; if he be a slave or bondman, this is defect of liberty, and he cannot be a *liber et legalis homo*. Under the word *homo* also, though a name common to both sexes, the female is however excluded, *propter defectum sexus*: except when a widow feigns herself with child in order to exclude the next heir, and a supposititious birth is suspected to be intended; then, upon the writ *de ventre inspiciendo*, a jury of women is to be impanelled to try the question whether with child or not. But the principal deficiency is defect of estate sufficient to qualify him to be a juror, which depends upon a variety of statutes*. 3. Jurors may be challenged *propter affectum*, for suspicion of bias or partiality. This may be either a principal challenge, or to the favour. A principal challenge is such, where the cause assigned carries with it, *prima facie*, evident marks of suspicion either of malice or favour; as, that a juror is of kin to either party within the ninth degree; that he has an interest in the cause; that there is an action depending between him and the party; that he has taken money for his verdict, &c. which, if true, cannot be overruled, for jurors must be *omni exceptione majores*. Challenges to the favour, are where the party hath no principal challenge; but objects only some probable circumstances of suspicion, as acquaintance, and the like; the validity of which must be left to the determination of *triori*, whose office it is to decide whether the juror be favourable or unfavourable. 4. Challenges *propter delictum*, are for some crime or misdemeanour that affects the juror's credit, and renders him infamous: As for a conviction of treason, felony, perjury, or conspiracy; or if, for some infamous offence, he hath received judgment of the pillory or the like.

II. In criminal cases, challenges may be made either on the part of the king, or on that of the prisoner; and either to the whole array, or to the separate polls, for the very same reasons that they may be in civil causes. For it is here at least as necessary as there, that the sheriff or returning officer be totally indifferent; that, where an alien is indicted, the jury should be *de medietate*, or half foreigners, if so many are found in the place (which does not indeed hold in treasons, aliens being very improper judges of the

breach of allegiance; nor yet in the case of Egyptians under the statute 22 Hen. VIII. c. 10.) that on every panel there should be a competent number of hundreds; and that the particular jurors should be *omni exceptione majores*, not liable to objections either *propter honoris respectum, propter defectum, propter affectum, or propter delictum*.

Challenges on any of the foregoing accounts are styled challenges *for cause*; which may be without stint in both civil and criminal trials. But in criminal cases, or at least in capital ones, there is, *in favorem vite*, allowed to the prisoner an arbitrary and capricious species of challenge to a certain number of jurors, without shewing any cause at all; which is called a peremptory challenge: a provision full of that tenderness and humanity to prisoners for which our laws are justly famous. This is grounded on two reasons: 1. As every one must be sensible what sudden impressions and unaccountable prejudices we are apt to conceive upon the bare looks and gestures of another; and how necessary it is, that a prisoner, when put to defend his life, should have a good opinion of his jury, the want of which might totally disconcert him; the law wills not that he should be tried by any one man against whom he has conceived a prejudice even without being able to assign a reason for such his dislike. 2. Because upon challenges for cause shewn, if the reason assigned prove insufficient to set aside the juror, perhaps the bare questioning his indifference may sometimes provoke a resentment; to prevent all ill consequences from which, the prisoner is still at liberty, if he pleases, peremptorily to set him aside.

This privilege of peremptory challenges, though granted to the prisoner, is denied to the king by the statute 33 Edward I. stat. 4. which enacts, that the king shall challenge no jurors without assigning a cause certain to be tried and approved by the court. However, it is held that the king need not assign his cause of challenge, till all the panel is gone through, and unless there cannot be a full jury without the persons so challenged. And then, and not sooner, the king's counsel must shew the cause: otherwise the juror shall be sworn.

The peremptory challenges of the prisoner must, however, have some reasonable boundary; otherwise he might never be tried. This reasonable boundary is settled by the common law to be the number of 35; that is, one under the number of three full juries. For the law judges, that 35 are fully sufficient to allow the most timorous man to challenge through mere caprice; and that he who peremptorily challenges a greater number, or three full juries, has no intention to be tried at all. And therefore it deals with one who peremptorily challenges above 35, and will not retract his challenge, as with one who stands mute or refuses his trial; by sentencing him to the *peine forte et dure* in felony, and by attainting him in treason. And so the law stands at this day with regard to treason of any kind. But by statute 22 Hen. VIII. c. 14. (which, with regard to felonies, stands unrepealed), no person arraigned for felony can be admitted to make more than 20 peremptory challenges.

CHALLON-SUR-SAONE, an ancient town of France, in Burgundy, and capital of the Chalonnois,

Challenge.
1
Challone-
sur-Saone.

* *Writ Black-*
stone's
Comm. III.
362.

Challons-
sur-Marne
|
Chaloner.

with a citadel and bishop's fee. It is seated on the river Saone, in E. Long. 5. 7. N. Lat. 46. 47.

CHALLONS-sur-Marne, a large episcopal town of France, in Champagne. It carries on a considerable trade in shallons, and other woollen stuffs. It is seated between two fine meadows on the rivers Marne, Mau, and Nau, in E. Long. 4. 37. N. Lat. 48. 57.

CHALONER (Sir Thomas), a statesman, soldier, and poet, descended from a good family in Denbigh in Wales, was born at London about the year 1515. Having been educated in both universities, but chiefly at Cambridge, he was introduced at the court of Henry VIII. who sent him abroad in the retinue of Sir Henry Knevet ambassador to Charles V. and he had the honour to attend that monarch on his fatal expedition against Algiers in 1541*. Soon after the fleet left that place, he was shipwrecked on the coast of Barbary in a very dark night: and having exhausted his strength by swimming, he chanced to strike his head against a cable, which he had the presence of mind to catch hold of with his teeth; and, with the loss of several of them, was drawn up by it into the ship to which he belonged. Mr Chaloner returned soon after to England, and was appointed first clerk of the council, which office he held during the rest of that reign. On the accession of Edward VI. he became a favourite of the Duke of Somerset, whom he attended to Scotland, and was knighted by that nobleman after the battle of Muffelburgh, in 1547. The protector's fall put a stop to Sir Thomas Chaloner's expectations, and involved him in difficulties. During the reign of queen Mary, being a determined protestant, he was in some danger; but having many powerful friends, he had the good fortune to escape. On the accession of queen Elizabeth, he appeared again at court; and was so immediately distinguished by her majesty, that she appointed him ambassador to the emperor Ferdinand I. being the first ambassador she nominated. His commission was of great importance; and the queen was so well satisfied with his conduct, that, soon after his return, she sent him in the same capacity to Spain: but Sir Thomas was by no means satisfied with this instance of her majesty's confidence: the courts of England and Spain being at this time extremely dissatisfied with each other, he foresaw that his situation would be very disagreeable; and so it proved; but Elizabeth must be obeyed. He embarked for Spain in 1561, and returned to London in 1564, in consequence of a request to his sovereign, in an elegy written in imitation of Ovid. After his return, he resided in a house built by himself in Clerkenwell-clofe, where he died in the year 1565, and was buried in St Paul's. Sir William Cecil assisted as chief mourner at his funeral.

So various were the talents of Sir Thomas Chaloner, that he excelled in every thing to which he applied

himself. He made a considerable figure as a poet. His poetical works were published, by William Malim, master of St Paul's school, in 1579. His capital work was that "Of restoring the English republic, in ten books," which he wrote when he was ambassador in Spain. It is remarkable, that this great man, who knew how to transact as well as write upon the most important affairs of states and kingdoms, could descend to compose a *dictionary for children*, and to translate from the Latin a book *Of the office of servants*, merely for the utility of the subjects.

CHALONER (Sir Thomas) the younger, though inconsiderable as an author, deserves to be recorded as a skilful naturalist, in an age wherein natural history was very little understood in this or any other country; and particularly as the founder of the alum-works in Yorkshire, which have since proved so exceedingly advantageous to the commerce of this kingdom. He was the only son of Sir Thomas Chaloner mentioned in the last article, and was born in the year 1559. Being very young at the time of his father's death, the lord treasurer Burleigh taking charge of his education, sent him to St Paul's school, and afterwards to Magdalen college in Oxford, where, like his father, he discovered extraordinary talents for Latin and English poetry. About the year 1580, he made the tour of Europe, and returned to England before 1584, for, in that year, we find him a frequent attendant in the court of queen Elizabeth. About this time he married the daughter of Sir William Fleetwood, recorder of London. In 1591 he was knighted; and, some time after, discovered the alum-mines on his estate at Gilsborough, near the river Tees in Yorkshire†.

Towards the latter end of the queen's reign, Sir Thomas visited Scotland; and returning to England in the retinue of king James I. found such favour in the sight of his majesty, that he was immediately appointed governor to prince Henry, whom he constantly attended, and, when his royal pupil visited Oxford, was honoured with the degree of master of arts. How he was employed after the death of the prince is not known. Some years before that event, he married a second wife, the daughter of Mr William Blount of London, by whom he had some children. He died in the year 1615, and was buried at Chiswick in Middlesex. His eldest son William was created a baronet in the 18th of James anno 1620. The title was extinct in 1681. He wrote, 1. *Dedication to lord Burleigh of his father's poetical works*, dated 1579. 2. *The virtue of nitre*, wherein is declared the sundry cures by the same effected. Lond. 1584, 4to.

CHALYBEAT, in medicine, an appellation given to any liquid, as wine or water, impregnated with particles of iron or steel.

Dr Monro, professor of anatomy at Edinburgh, by pouring a tincture of galls into common water, and dissolving

Chaloner
|
Chalybeat

* See *Algiers*, n^o 14.
—20.

† Sir Thomas, during his residence in Italy, being particularly fond of natural history, spent some time at Puzoli, where he was very attentive to the art of producing alum. This attention proved infinitely serviceable to his country, though of no great benefit to himself or family; his attempt being attended with much difficulty and expence. It was begun about the year 1600, in the reign of queen Elizabeth; but was not brought to any degree of perfection till some time in the reign of Charles I. by the assistance of one Ruffel a Walloon, and two other workmen brought from the alum-works at Rochelle. By one of the arbitrary acts of Charles, it was then deemed a mine royal, and granted to Sir Paul Pindar. The long parliament adjudged it a monopoly, and justly restored it to the original proprietors.

Chalybeated dissolving therein a small quantity of sal martis, adding some filing of iron, and oil of vitrol, procured a water exactly like the natural chalybeate water; and he is of opinion, that where these are not to be had, the artificial water may be made to answer all their intentions, according to its being more or less closely kept, or exposed in the air or heat, &c.

CHALYBEATED TARTAR. See **CHEMISTRY**, n^o 299.

CHAM, or **KHAN**, a word of much the same import with *king* in English: It is the title of the sovereign princes of Tartary, and is likewise applied to the principal noblemen in Persia.

CHAM, in geography, a town of the Bavarian palatinate, situated on a river of the same name, about 25 miles north-east of Ratibon; E. Long. 13. N. Lat. 49. 15.

CHAMA, in zoology, a genus of shell-fish belonging to the order of vermes testacea. The shell is thick, and has two valves; it is an animal of the oyster kind. Linnaeus enumerates 14 species, principally distinguished by the figure of their shells.

CHAMADE, in war, a certain beat of a drum, or sound of a trumpet, which is given the enemy as a signal to inform them of some proposition to be made to the commander, either to capitulate, to have leave to bury their dead, make a truce, or the like.——Menage derives the word from the Italian *chiamata*, or *clamare* to “cry.”

CHAMÆDRYS, in botany. See **VERONICA**.

CHAMÆLEON, in zoology, the trivial name of a species of **LACERTA**.

CHAMÆPITYS, in botany. See **TEUCRIUM**.

CHAMÆROPS, DWARF PALM, or PALMETTO; a genus of the palmæ flabellifoliz of Linnaeus. There are two species, the most remarkable of which is the glabra, a native of the West Indies, and warm parts of America, also of the corresponding latitudes of Asia and Africa. It never rises with a tall stem; but when the plants are old, their leaves are five or six feet long, and upwards of two feet broad; these spread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand. This plant the Americans call *thatch*, from the use to which the leaves are applied.—Under the name of palmetto, however, Mr Adanson describes a species of palm which grows naturally at Senegal, whose trunk rises from 50 to 60 feet in height: from the upper end of the trunk issues a bundle of leaves, which, in turning off, form a round head; each leaf represents a fan of five or six feet in expansion, supported by a tail of the same length. Of these trees, some produce male flowers, which are consequently barren; others are female, and loaded with fruit, which succeed each other uninterruptedly almost the whole year round. The fruit of the large palmettos, Mr Adanson affirms to be of the bigness of an ordinary melon, but rounder: it is enveloped in two skins as tough as leather, and as thick as strong parchment; within the fruit is yellowish, and full of filaments fastened to three large kernels in the middle. The negroes are very fond of this fruit, which, when baked under the ashes, is said to taste like a quince.

The little palmetto may be easily raised in this country from seeds brought from America; but, as

the plants are tender, they must be constantly kept in a bark-stove.

CHAMANIM, in the Jewish antiquities, is the Hebrew name for that which the Greeks call *Pyreia* or *Pyrateria*; and St Jerom in Leviticus has translated *Simulachra*, in Isaiah, *d. labra* *. These chamanim were, according to Rabbi Solomon, idols exposed to the sun upon the tops of houses. Abenezra says they were portable chapels or temples made in the form of chariots, in honour of the sun. What the Greeks call *Pyreia*, were temples consecrated to the sun and fire, wherein a perpetual fire was kept up. They were built upon eminences; and were large inclosures without covering, where the sun was worshipped. The Guebres, or worshippers of fire, in Persia and the East Indies, have still these *Pyreia*. The word *chamanim* is derived from *Chaman*, which signifies to warm, or burn.

CHAMARIM, a word which occurs in several places of the Hebrew bible, and is generally translated the *priests of the idols*, or the *priests clothed in black*, because *chamar* signifies “black,” or “blackness.” St Jerom in the second book of Kings†, renders it *aruspices*. In Hosea and Zephaniah‡, he translates it *adui* or church-wardens. But the best commentators are of opinion, that by this word we are to understand the priests of the false gods, and in particular the worshippers of fire; because they were, as they say, dressed in black; or perhaps the Hebrews gave them this name in derision, because as they were continually employed in taking care about the fowel, and keeping up the fire, they were always as black as smiths or colliers. We find priests, among those of Isis, called *melanchori*, that is to say, that wear black; but whether this may be by reason of their dressing in black, or whether it were because they wore a certain shining black veil in the processions of this goddess, is not certain. *Gamar*, in Arabic, signifies the “moon.” Isis is the same deity. Grotius thinks the Roman priests, called *camilli*, came from the Hebrew *chamarim*. Those among the heathens who sacrificed to the infernal gods were dressed in black.

CHAMBER, in building, a member of a lodging, or piece of an apartment, ordinarily intended for sleeping in; and called by the Latins *cubiculum*. The word comes from the Latin *camera*; and that, according to Nicod, from the Greek *καμαρα*, *vault* or *curve*; the term *chamber* being originally confined to places arched over.

A complete apartment is to consist of a hall, anti-chamber, *chamber*, and cabinet.

Privy-CHAMBER. Gentlemen of the privy-chamber, are servants of the king, who are to wait and attend on him and the queen at court, in their diversions, &c. Their number is forty-eight under the lord-chamberlain, twelve of whom are in quarterly waiting, and two of these lie in the privy-chamber.

In the absence of the lord-chamberlain, or vice-chamberlain, they execute the king's orders: at coronations, two of them personate the dukes of Aquitaine and Normandy; and six of them, appointed by the lord-chamberlain, attend ambassadors from crowned heads to their audiences, and in public entries. The gentlemen of the privy-chamber were instituted by Henry VII.

Chamber.

CHAMBER, in policy, the place where certain assemblies are held, also the assemblies themselves. Of these some are established for the administration of justice, others for commercial affairs.

Of the first kind are, 1. Star-chamber, so called, because the roof was painted with stars; the authority, power and jurisdiction of which are absolutely abolished by the statute 17, Car. 1. 2. Imperial chamber of Spire, the supreme court of judicatory in the empire, erected by Maximilian I. This chamber has a right of judging by appeal; and is the last resort of all civil affairs of the states and subjects of the empire, in the same manner as the aulic council of Vienna. Nevertheless it is restrained in several cases: it takes no notice of matrimonial causes, these being left to the pope; nor of criminal causes, which either belong to particular princes or towns in their respective territories, or are cognizable by all the states of the empire in a diet. By the treaty of Osnaburg, in 1648, fifty assessors were appointed for this chamber, whereof twenty-four were to be Protestants, and twenty-six Catholics; besides five presidents, two of them Protestants, and the rest Catholics. 3. Chamber of accounts, a sovereign court in France, where accounts are rendered of all the king's revenues, inventories, and avowals thereof registered; oaths of fidelity taken, and other things relating to the finances transacted. There are nine in France, that of Paris is the chief; it registers proclamations, treaties of peace, naturalizations, titles of nobility, &c. All the members wear long black gowns of velvet, of sattin, or damask, according to their places. 4. Ecclesiastical chambers in France, which judge by appeal of differences about collecting the tithes. 5. Chamber of audience, or grand chamber, a jurisdiction in each parliament of France, the counsellors of which are called *juges*, or judges, as those of the chamber of inquests are called *rapportheurs*, reporters of processes by writing. 6. Chamber of the edict, or miparty, a court established by virtue of the edict of pacification in favour of those of the reformed religion. This chamber is now suppressed. 7. Apostolical chamber of Rome, that wherein affairs relating to the revenues of the church and the pope are transacted. This council consists of the cardinal-camerlingo, the governor of the rota, a treasurer, an auditor, a president, one advocate-general, a solicitor-general, a commissary, and 12 clerks. 8. Chamber of London, an apartment in Guildhall, where the city-money is deposited.

Of the last sort are, 1. The chambers of commerce. 2. The chambers of affluance. And, 3. The royal or syndical chamber of bookfellers in France.

The chamber of commerce is an assembly of merchants and traders, where the affairs relating to trade are treated of. There are several established in most of the chief cities of France; and in our own country, we have lately seen chambers of this kind erected for carrying on the British herring-fishery. Chamber of affluance in France, denotes a society of merchants and others for carrying on the business of insuring; but in Holland, it signifies a court of justice, where causes relating to insurances are tried. Chamber of bookfellers in Paris, an assembly consisting of a syndic and assistants, elected by four delegates from the prin-

ters, and twelve from the bookfellers, to visit the books imported from abroad, and to search the houses of fellers of marbled paper, printfellers, and dealers in printed paper for hangings, who are prohibited from keeping any letters proper for printing books. In the visitation of books, which ought to be performed by three persons at least from among the syndic and assistants, all libels against the honour of God and the welfare of the state, and all books printed either within or without the kingdom in breach of their regulations and privileges, are swept, even with the merchandises that may happen to be in the bales with such libels or other prohibited books. The days appointed for this chamber to meet, are Tuesdays and Fridays, at two o'clock in the afternoon.

CHAMBER, in military affairs. 1. Powder-chamber, or bomb-chamber; a place sunk under ground for holding the powder, or bombs, where they may be out of danger, and secured from the rain. 2. Chamber of a mine; the place, most commonly of a cubical form, where the powder is confined. 3. Chamber of a mortar; that part of the chase, much narrower than the rest of the cylinder, where the powder lies. It is of different forms; sometimes like a reversed cone; sometimes globular, with a neck for its communication with the cylinder, whence it is called a bottled chamber; but most commonly cylindrical, that being the form which is found by experience to carry the ball to the greatest distance.

CHAMBERLAIN, an officer charged with the management and direction of a chamber. See CHAMBER, in policy.

There are almost as many kinds of chamberlains as chambers, the principal whereof are as follows.

Lord CHAMBERLAIN of Great Britain, the sixth great officer of the crown; to whom belongs lively and lodging in the king's court; and there are certain fees due to him from each archbishop or bishop when they perform their homage to the king, and from all peers at their creation or doing their homage. At the coronation of every king, he is to have forty ells of crimson velvet for his own robes. This officer, on the coronation-day, is to bring the king his shirt, coif, and wearing cloths; and after the king is dressed, he claims his bed, and all the furniture of his chamber, for his fees: he also carries at the coronation, the coif, gloves, and linen, to be used by the king on that occasion; also the sword and scabbard, the gold to be offered by the king, and the robes-royal and crown: he dresses and undresses the king on that day, waits on him before and after dinner, &c.

To this officer belongs the care of providing all things in the house of lords, in the time of parliament; to him also belongs the government of the palace of Westminster: he disposes likewise of the sword of state, to be carried before the king, to what lord he pleases.

Lord CHAMBERLAIN of the Household, an officer who has the oversight and direction of all officers belonging to the king's chambers, except the precinct of the king's bed-chamber.

He has the oversight of the officers of the wardrobe at all his majesty's houses, and of the removing wardrobes, or of beds, tents, revels, music, comedians, hunting,

Chamber

Chamber-lain.

hunting, messengers, &c. retained in the king's service. He moreover has the oversight and direction of the serjeants at arms, of all physicians, apothecaries, surgeons, barbers, the king's chaplain, &c. and administers the oath to all officers above stairs.

Other chamberlains, are those of the king's court of exchequer, of North Wales, of Chester, of the city of London, &c. in which cases this officer is generally the receiver of all rents and revenues belonging to the place whereof he is chamberlain.

In the exchequer there are two chamberlains, who keep a controulment of the pells of receipts and exits, and have certain keys of the treasury, records, &c.

CHAMBERLAIN of London keeps the city money, which is laid up in the chamber of London: he also presides over the affairs of masters and apprentices, and makes free of the city, &c.

His office lasts only a year; but the custom usually obtains to re-chule the same person, unless charged with any misdemeanour in his office.

CHAMBERLAYNE (Edward), descended from an ancient family, was born in Gloucestershire 1616, and made the tour of Europe during the distractions of the civil war. After the restoration, he went as secretary with the earl of Carlisle, who carried the order of the Garter to the king of Sweden; was appointed tutor to the duke of Grafton, natural son of Charles II. and was afterwards pitched on to instruct prince George of Denmark in the English tongue. He died in 1703, and was buried in a vault in Chelsea churchyard: his monumental inscription mentions six books of his writing; and that he was so desirous of doing service to posterity, that he ordered some copies of his books to be covered with wax, and buried with him. That work by which he is best known, is his *Anglæ Notitiæ, or the Present State of England*, which has been often since printed.

CHAMBERRY, a considerable and populous town of Italy, in Savoy, with a castle. It is capital of the duchy, and well built, but has no fortifications. It is watered by several streams, which have their sources in St Martin's-hill, and run through several of the streets. There are piazzas under most part of the houses, where people may walk dry in the worst weather. It hath large and handsome suburbs; and in the center of the town is the royal palace. The parliament meet here, which is composed of four prebends, and a pretty large number of senators, being the supreme tribunal of the whole duchy. The principal church is St Legar, and the Jesuits college is the most magnificent of all the monasteries. E. Long. 5. 50. N. Lat. 45. 35.

CHAMBERS (David), a Scots historian, priest, and lawyer, was born in the shire of Ross, about the year 1530, and educated in the university of Aberdeen. From thence he went to France and Italy, where he continued some time, particularly at Bologna, where, in 1556, he was a pupil of Marianus Sozenus.

After his return to Scotland, he was appointed, by queen Mary, parson of Suddy and chancellor of Ross. He was soon after employed in digesting the laws of Scotland, and was principally concerned in publishing the acts of parliament of that kingdom by authority in 1566. He was also appointed one of the lords of

session, and continued her majesty's faithful servant till her declining fortune obliged her adherents to seek for refuge in other kingdoms. Chambers went first to Spain, where he was graciously received by king Philip; and thence he travelled to Paris, where he was no less kindly received by Charles IX. of that kingdom, to whom, in 1572, he presented his history of Scotland, &c. He died at Paris in the year 1592, much regretted (says Mackenzie) by all who knew him. His writings were chiefly calculated to assist his royal mistresses, and to extol the wisdom of the Scots nation.

CHAMBERS (Ephraim), an eminent philosopher and fellow of the royal society, who has perpetuated his name by a most laborious work, first published in 1727, in two folio volumes, under the title of *Cyclopædia; or, An Universal Dictionary of Arts and Sciences*. All we know of Mr Chambers, is, that he served an apprenticeship to Senex a globe and map maker; but finding himself under no necessity to follow business, he took chambers in Gray's-Inn, devoted himself to study, and died about the year 1740.—The proprietors of the above work afterwards procured a *Supplement* to be compiled, which extended to two volumes more. Of both these the compilers of the *ENCYCLOPEDIA BRITANNICA* have availed themselves, by extracting every thing of value; every thing that, in the present improved state of science, seemed admissible, or concerning which no better information could be obtained.

CHAMBRE (Martin Cureau de la), physician in ordinary to the French king, was distinguished by his knowledge in medicine, philosophy, and polite learning. He was born at Mons; and was received into the French academy in 1635, and afterwards into the academy of sciences. He wrote a great number of works, the principal of which are, 1. The characters of the passions. 2. The art of knowing men. 3. On the knowledge of beasts, &c. He died at Paris in 1669.

CHAMELEON. See LACERTA.

CHAMFERING, in architecture, a phrase used for cutting any thing aslope on the under side.

CHAMIER (Daniel), an eminent protestant divine, born in Dauphiné. He was many years preacher at Montellimart; from whence he went, in 1612, to Montauban, to be professor of divinity in that city, and was killed by a cannon-ball during the siege in 1621. The most considerable of his works is his *L'assuetude Catholique*, or "Wars of the Lord," in four volumes, folio, in which he treats very learnedly of the controversies between the Protestants and Roman Catholics.

CHAMOIS, or CHAMOIS-GOAT, in zoology. See CAPRA.

CHAMOMILE. See ANTHEMIS.

CHAMOS, or CEMOSH, the idol or god of the Moabites.

The name of *chamos* comes from a root which, in Arabic, signifies to *make haste*; for which reason many believe *chamos* to be the sun, whose precipitate course might well procure it the name of swift or speedy. Others have confounded *chamos* with the god *Hammon*, adored not only in Libya and Egypt, but also in Arabia, Ethiopia, and the Indies.

Macrobius

Champagne
Champer-
try.

Macrobius shews that Hammon was the sun; and the horns, with which he was represented, denoted his rays. Calmet is of opinion, that the god Hamonus, and Apollo Chomeus, mentioned by Strabo and Ammianus Marcellinus, was the very same as chamos or the sun. These deities were worshipped in many of the eastern provinces. Some who go upon the resemblance of the Hebrew term *chamos*, to that of the Greek *comos*, have believed chamos to signify the god Bacchus the god of drunkenness, according to the signification of the Greek *comos*. St Jerom, and with him most other interpreters, take Chamos and Peor for the same deity. But it seems that Baal-Peor was the same as Tammuz or Adonis; so that Chamos must be the god whom the heathens call the Sun.

CHAMPAGNE, a considerable province of France, about 162 miles in length, and 112 in breadth, bounded on the north by Hainhalt and Luxemburg, on the east by Lorrain and the Franche-Comté, on the south by Burgundy, and on the west by the ile of France and Soissonois. It has a great number of rivers, the principal of which are the Meuse, the Seine, the Marne, the Aube, and the Aine. Its principal trade consists in excellent wine, all sorts of corn, linen, cloth, woollen stuffs, cattle, and sheep. It is also divided into the higher and lower, and Troys is the capital town. Its sub-divisions are Champagne Proper, and Rheimois, the Retelois, the Pertois, the Vallage, Bassigni, the Senois, and the Brie Champenois.

CHAMPAGNE Proper, is one of the eight parts of Champagne, which comprehend the towns of Troys, Chalons, St Menchold, Epemey, and Vertus.

CHAMPAIN, or Point CHAMPAIN, in heraldry, a mark of dishonour in the coat of arms of him who kills a prisoner of war after he has cried quarter.

CHAMPERTRY, in law, a species of MAINTRENANCE, and punished in the same manner; being a bargain with the plaintiff or defendant *champum partire*, "to divide the land," or other matter sued for between them, if they prevail at law; whereupon the champertor is to carry on the party's suit at his own expence. Thus *champart*, in the French law, signifies a similar division of profits, being a part of the crop annually due to the landlord by bargain or custom. In our sense of the word, it signifies the purchasing of a suit, or right of suing; a practice so much abhorred by our law, that it is one main reason why a *chose* in action, or thing of which one hath the right but not the possession, is not assignable in common law; because no man should purchase any pretence to sue in another's right. These pests of civil society, that are perpetually endeavouring to disturb the repose of their neighbours, and officiously interfering in other mens quarrels, even at the hazard of their own fortunes, were severally animadverted on by the Roman law; and were punished by the forfeiture of a third part of their goods and perpetual infamy. Hitherto also must be referred the provision of the statute 32 Henry VIII. c. 9. that no one shall sell or purchase any pretended right or title to land, unless the vender hath received the profits thereof for one whole year before such grant, or hath been in actual possession of the land, or of the reversion or remainder; on pain that both purchaser and vender shall each for-

Champion.
Chance.

feit the value of such land to the king and the profecutor. CHAMPION, a person who undertakes a combat in the place or quarrel of another; and sometimes the word is used for him who fights in his own cause.

It appears that champions, in the just sense of the word, were persons who fought instead of those that, by custom, were obliged to accept the duel, but had a just excuse for dispensing with it, as being too old, infirm, or being ecclesiastics, and the like. Such causes as could not be decided by the course of common law, were often tried by single combat; and he who had the good fortune to conquer, was always reputed to have justice on his side. See the article BATTLE.

CHAMPION of the King, (*campio regis*), is an ancient officer, whose office is, at the coronation of our kings, when the king is at dinner, to ride armed *cap-a-pee*, into Westminster-Hall, and by the proclamation of an herald make a challenge, "That if any man shall deny the king's title to the crown, he is there ready to defend it in single combat, &c." which being done, the king drinks to him, and sends him a gilt cup with a cover full of wine, which the champion drinks, and hath the cup for his fee. This office, at the coronation of king Richard II. when Baldwin Freville exhibited his petition for it, was adjudged from him to his competitor Sir John Dymocke (both claiming from Marmion), and hath continued ever since in the family of the Dymockes; who hold the manor of Sinvellby in Lincolnshire, hereditary from the Marmions by grand fejeantry, viz. that the lord thereof shall be the king's champion as aforesaid. Accordingly Sir Edward Dymocke performed this office at the coronation of king Charles II. and a person of the name of Dymocke performed at the coronation of his present majesty George the third.

CHAMPLAIN (Samuel de), a celebrated French navigator, the founder of the colony of New France, or Canada. He built Quebec; and was the first governor of the colony in 1603. Died after 1649. See QUEBEC.

CHANCE, a term we apply to events, to denote that they happen without any necessary or foreknown cause. See CAUSE.

Our aims, to ascribe those things to *chance*, which are not necessarily produced as the natural effects of any proper cause: but our ignorance and precipitancy lead us to attribute effects to *chance*, which have a necessary and determinate cause.

When we say a thing happens *by chance*, we really mean no more, than that its cause is unknown to us: not, as some vainly imagine, that *chance* itself can be the cause of any thing.

The case of the painter, who, unable to express the foam at the mouth of a horse he had painted, threw his sponge in despair at the piece, and, *by chance*, did that which he could not before do by design, is an eminent instance of the force of *chance*: yet, it is obvious, all we here mean by *chance*, is, that the painter was not aware of the effect; or that he did not throw the sponge with such a view: not but that he actually did every thing necessary to produce the effect; inasmuch, that, considering the direction wherein he threw his sponge, together with its form, specific

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specific gravity, the colours wherewith it was lineared, and the distance of the hand from the piece, it was impossible, on the present system of things, the effect should not follow.

Chance is frequently personified, and erected into a chimerical being, whom we conceive as acting arbitrarily, and producing all the effect whose real causes do not appear to us: in which sense the word coincides with the *τὸν, fortuna*, of the ancients.

CHANCE is also used for the manner of deciding things, the conduct or direction whereof is left at large, and not reducible to any determinate rules or measures; or where there is no ground for preference: as at cards, dice, lotteries, &c.

For the Laws of CHANCE, or the Proportion of Hazard in Gaming. See *GAME*.

The ancient *forts* or *chance*, M. Placetote observes, was instituted by God himself; and in the Old Testament we find several standing laws and express commands which prescribed its use on certain occasions: hence, the scripture says, "The lot, or *chance*, fell on Matthias," when it was in question who should fill Judas's place in the apostolate.

Hence also arose the *sortes sanctorum*; or method of determining things, among the ancient Christians, by opening some of the sacred books, and pitching on the first verse they cast their eye on, as a sure prognostic of what was to befall them. The *sortes Homerice, Virgiliane, Prænestine*, &c. used by the heathens, were with the same view, and in the same manner. See *SORTES*.

St Augustin seems to approve of this method of determining things future, and owns that he had practised it himself; grounded on this supposition, that God presides over *chance*; and on *Prov. xvi. 33*.

Many among the modern divines hold *chance* to be conducted in a particular manner by providence; and esteem it an extraordinary way which God uses to declare his will, and a kind of immediate revelation.

CHANCE-Medley, in law, is where one is doing a lawful act, and a person is killed by chance thereby; for if the act be unlawful, it is felony. If a person casts, not intending harm, a stone, which happens to hit one, whereof he dies; or shoots an arrow in an highway, and another that passeth by is killed thereby; or if a workman, in throwing down rubbish from a house, after warning to take care, kills a person; or a schoolmaster in correcting his scholar, a master his servant, or an officer in whipping a criminal in a reasonable manner, happens to occasion his death; it is chance-medley and misadventure. But if a man throw stones in a highway, where persons usually pass; or shoot an arrow, &c. in a market place among a great many people; or if a workman cast down rubbish from a house, in cities and towns where people are continually passing; or a school-master, &c. correct his servant or scholar, &c. exceeding the bounds of moderation; it is manslaughter; and if with an improper instrument of correction, as with a sword or iron bar, or by kicking, stamping, &c. in a cruel manner, it is murder. If a man whips his horse in a street to make him gallop, and the horse runs over a child and kills it, it is manslaughter.

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slaughter: but if another whips the horse, it is manslaughter in him, and chance-medley in the rider. And if two are fighting, and a third person coming to part them is killed by one of them without any evil intent, yet this is murder in him; and not manslaughter by chance-medley or misadventure. In chance-medley, the offender forfeits his goods; but hath a pardon of course.

CHANCELLER, is properly that part of the choir of a church, between the altar or communion-table, and the balustrade or rail that incloses it; where the minister is placed at the celebration of the communion. The word comes from the Latin *cancellus*, which in the lower Latin is used in the same sense, from *cancelli*, "lattices or cross bars," wherewith the *chancels* were anciently incompassed, as they now are with rails. The right of a seat and a sepulchre in the *chancels*, is one of the privileges of founders.

CHANCELLOR, was at first only a chief notary or scribe under the emperors; and was called *cancellarius*, because he sat behind a lattice (in Latin *cancellus*) to avoid being crowded by the people: though some derive the word from *cancellare* to cancel; (see *CHANCERY*.) This officer was afterwards invested with several judicial powers, and a general superintendency over the rest of the officers of the prince. From the Roman empire it passed to the Roman church, ever emulous of imperial state; and hence every bishop has to this day his chancellor, the principal judge of his consistory. And when the modern kingdoms of Europe were established upon the ruins of the empire, almost every state preferred its chancellor with different jurisdictions and dignities, according to their different constitutions. But in all of them he seems to have had the supervision of all charters, letters, and such other public instruments of the crown as were authenticated in the most solemn manner: and therefore, when seals came in use, he had always the custody of the king's great seal.

Lord High CHANCELLOR of Great Britain, or *Lord Keeper of the Great Seal*, is the highest honour of the long robe, being created by the mere delivery of the king's great seal into his custody: whereby he becomes, without writ or patent, an officer of the greatest weight and power of any now subsisting in the kingdom; and superior, in point of precedence, to every temporal lord. He is a privy counsellor by his office; and, according to Lord Chancellor Ellesmere, prolocutor of the house of lords by prescription. To him belongs the appointment of all the justices of the peace throughout the kingdom. Being in former times usually an ecclesiastic, (for none else were then capable of an office so conversant in writing,) and presiding over the royal chapel, he became keeper of the king's conscience; visitor, in right of the king, of all hospitals and colleges of the king's foundation; and patron of all the king's livings under the value of *L. 20 per annum*, in the king's books. He is the general guardian of all infants, idiots, and lunatics; and has the general superintendency of all charitable uses in the kingdom. And all this over and above the vast extensive jurisdiction which he exercises in his judicial capacity in the court of chancery. See *CHANCERY*.

Chancel
|
Chancellor.

Chancellor

Chancery.

CHANCELLOR of a *Cathedral*, an officer that hears lessons and lectures read in the church, either by himself or his vicar; to correct and set right the reader when he reads amiss; to inspect schools; to hear causes; apply the seal; write and dispatch the letters of the chapter; keep the books; take care that there be frequent preachings, both in the church and out of it; and assign the office of preaching to whom he pleases.

CHANCELLOR of the *Duchy of Lancaster*, an officer appointed chiefly to determine controversies between the king and his tenants of the duchy-land, and otherwise to direct all the king's affairs belonging to that court. See *DUCHY-Court*.

CHANCELLOR of the *Exchequer*, an officer who presides in that court, and takes care of the interest of the crown. He is always in commission with the lord-treasurer, for the letting of crown-lands, &c. and has power, with others, to compound for forfeitures of lands, upon penal statutes: He has also great authority in managing the royal revenues, and in matters relating to the first-fruits.

CHANCELLOR of the *Order of the Garter*, and other *Military Orders*, is an officer who seals the commissions and mandates of the chapter and assembly of the knights, keeps the register of their proceedings, and delivers acts thereof under the seal of their order.

CHANCELLOR of an *University*, is he who seals the diplomas, or letters of degrees, provision, &c. given in the university.

The chancellor of Oxford is usually one of the prime nobility, chosen by the students themselves in convocation. He is their chief magistrate; his office is, *durante vita*, to govern the university, preserve and defend its rights and privileges, convoke assemblies, and do justice among the members under his jurisdiction.

Under the chancellor is the vice-chancellor, who is chosen annually, being nominated by the chancellor, and elected by the university in convocation: He is always the head of some college, and in holy orders. His proper office is to execute the chancellor's power, to govern the university according to her statutes, to see that officers and students do their duty, that courts be duly called, &c. When he enters upon his office, he chuses four pro-vice-chancellors out of the heads of the colleges, to execute his power in his absence.

The chancellor of Cambridge is also usually one of the prime nobility, and in most respects the same as that in Oxford; only he does not hold his office *durante vita*, but may be elected every three years. Under the chancellor there is a commissary, who holds a court of record for all privileged persons and scholars under the degree of master of arts, where all causes are tried and determined by the civil and statute law, and by the custom of the university.

The vice-chancellor of Cambridge is chosen annually by the senate, out of two persons nominated by the heads of the several colleges and halls.

CHANCERON, in natural history, a name given by the French writers to the small caterpillar that eats the corn, and does vast mischief in their granaries. See the article *CORN-Butterfly*.

CHANCERY, the highest court of justice in Britain

next to the parliament, and of very ancient institution. It has its name chancery (*cancellaria*) from the judge who presides here, the lord chancellor, or *cancellarius*; who, according to Sir Edward Coke, is so termed a *cancellando*, from cancelling the king's letters patent when granted contrary to law, which is the highest point of his jurisdiction. In chancery there are two distinct tribunals: the one ordinary, being a court of common law; the other extraordinary, being a court of equity.

1. The ordinary legal court holds pleas of recognizances acknowledged in the chancery, writs of *scire facias*, for repeal of letters patent, writs of partition, &c. and also of all personal actions by or against any officer of the court. Sometimes a *superfideas*, or writ of privilege, hath been here granted to discharge a person out of prison: one from hence may have a *habeas corpus* prohibition, &c. in the vacation; and here a *subpena* may be had to force witnesses to appear in other courts, when they have no power to call them. But, in prosecuting causes, if the parties descend to issue, this court cannot try it by jury; but the lord chancellor delivers the record into the king's bench to be tried there; and after trial had, it is to be remanded into the chancery, and there judgment given: though if there be a demurrer in law, it shall be argued in this court.

In this court is also kept the *officina justitie*; out of which all original writs that pass under the great seal, all commissions of charitable uses, sewers, bankruptcy, idiocy, lunacy, and the like, do issue; and for which it is always open to the subject, who may there at any time demand and have, *ex debito justitie*, any writ that his occasions may call for. These writs, relating to the business of the subject, and the returns to them, were, according to the simplicity of ancient times, originally kept in a hamper, *in hanaperie*; and the others, (relating to such matters wherein the crown is mediately or immediately concerned,) were preserved in a little sack or bag, *in parva бага*; and hence hath arisen the distinction of the *hanaper* office, and the *petty-bag* office, which both belong to the common law-court in chancery.

2. The extraordinary court, or court of equity, proceeds by the rules of equity and conscience; and moderates the rigour of the common law, considering the *intention* rather than the *words* of the law. It gives relief for and against infants notwithstanding their minority, and for and against married women notwithstanding their coverture. All frauds and deceits, for which there is no redress at common law; all breaches of trust and confidence; and accidents, as to relieve obligors, mortgagers, &c. against penalties and forfeitures, where the intent was to pay the debt, are here remedied: for in chancery, a forfeiture, &c. shall not bind, where a thing may be done after, or compensation made for it. Also this court will give relief against the extremity of unreasonable engagements entered into without consideration; oblige creditors, that are unreasonable, to compound with an unfortunate debtor; and make executors, &c. give security and pay interest for money that is to lie long in their hands. This court may confirm title to lands, though one hath lost his writings; and render conveyances, defective through

Chancery.

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through mistake, &c. good and perfect. In chancery, copy-holders may be relieved against the ill usage of their lords; inclosures of lands that are common, be decreed; and this court may decree money or lands given to charitable uses, oblige men to account with each other, &c. But, in all cases where the plaintiff can have his remedy at law, he ought not to be relieved in chancery; and a thing which may be tried by a jury is not triable in this court.

The proceedings in chancery are, first to file the bill of complaint, signed by some counsel, setting forth the fraud or injury done, or wrong sustained, and praying relief; after the bill is filed, process of *subpoena* issues to compel the defendant to appear; and when the defendant appears, he puts in his answer to the bill of complaint, if there be no cause for the plea to the jurisdiction of the court, in disability of the person, or in bar, &c. Then the plaintiff brings his replication, unless he files exceptions against the answer as insufficient, referring it to a master to report whether it be sufficient or not; to which report exceptions may also be made. The answer, replication, rejoinder, &c. being settled, and the parties come to issue, witnesses are to be examined upon interrogatories, either in court, or by commission in the country, wherein the parties usually join; and when the plaintiff and defendant have examined their witnesses, publication is to be made of the depositions, and the cause is to be set down for hearing, after which follows the decree. But it is now usual to appeal to the house of lords; which appeals are to be signed by two noted counsel, and exhibited by way of petition: the petition or appeal is lodged with the clerk of the house of lords, and read in the house, whereon the apellee is ordered to put in his answer, and a day fixed for hearing the cause; and after counsel heard, and evidence given on both sides, the lords will affirm or reverse the decree of the chancery, and finally determine the cause by a majority of votes, &c.

CHANDELIER, in fortification, a kind of moveable parapet, consisting of a wooden frame, made of two upright stakes, about six feet high, with cross planks between them; serving to support fascines to cover the pioneers.

CHANDERNAGORE, a French settlement in the kingdom of Bengal in the East Indies. It lies on the river Ganges, two leagues and a half above Calcutta. The district is hardly a league in circumference, and has the disadvantage of being somewhat exposed on the western side; but its harbour is excellent, and the air is as pure as it can be on the banks of the Ganges. Whenever any building is undertaken that requires strength, it must here, as well as in all other parts of Bengal, be built upon piles: it being impossible to dig three or four feet without coming at water.

CHANDLER (Mary), distinguished by her talent for poetry, was the daughter of a dissenting minister at Bath; and was born at Malmesbury in Wiltshire, in 1687. She was bred a milliner; but from her childhood had a turn for poetry, and in her riper years applied herself to the study of the poets. Her poems, for which she was complimented by Mr Pope, breathe the spirit of piety and philosophy. She had the misfortune to be deformed, which determined her to live

single; though she had great sweetness of countenance, and was solicited to marry. She died in 1745, aged 58.

CHANDLER (Dr Samuel), a learned and respectable dissenting minister, descended from ancestors heartily engaged in the cause of religious liberty, and sufferers for the sake of conscience and nonconformity; was born at Hungerford in Berks, where his father was a minister of considerable worth and abilities. Being by his literary turn destined to the ministry, he was first placed at an academy at Bridgewater, and from thence removed to Gloucester under Mr Samuel Jones. Beginning to preach in 1714, he was two years afterwards chosen minister of a congregation at Peckham in Surry; and then joint preacher with the learned Dr Lardner, of a winter weekly evening lecture at the meeting-house in the Old Jewry London: in which meeting he was established assistant preacher about the year 1725, and then as the pastor. Here he ministered to the religious improvement of a very respectable congregation for 40 years with the greatest applause; and with what diligence and application he improved the vacancies of time from his pastoral duties, for improving himself and benefiting the world, will appear from his many writings on a variety of important subjects. While he was thus laudably employed, not only the universities of Edinburgh and Aberdeen gave him, without any application, testimonies of their esteem in diplomas, conferring on him the degree of D. D. but he also received offers of preferment from some of the governors of the established church, which he nobly declined. Dr Chandler first formed the plan of the fund for the widows and orphans of poor dissenting ministers; to which, by his interest and industry, he procured very generous subscriptions. He died in 1766.

CHANGER, an officer belonging to the king's mint, who changes money for gold, or silver bullion. See MINT.

Money-CHANGER, is a banker, who deals in the exchange, receipt, and payment, of moneys. See BANKER.

CHANGES, in arithmetic, &c. the permutations or variations of any number of quantities; with regard to their position, order, &c. See COMBINATION.

To find all the possible CHANGES of any Number of Quantities, or how oft their Order may be varied. Suppose two quantities a and b . Since they may be either wrote a or b , it is evident their changes are 2.—2. 1. Suppose three quantities a b c : their changes will be as in the margin; as is evident by combining c first with a , then with b ; and hence the number of changes arises 3. 2. 1.—6. If the quantities be 4, each may be combined four ways with each order of the other three; whence the number of changes arises 6. 4.—24. 3. 2. 1.—24. Wherefore, if the number of quantities be supposed n , the number of changes will be $n.n-1.n-2.n-3.n-4$, &c. If the same quantity occur twice, the changes of two will be found bb ; of three, bab , abb , bcb ; of four, $cbab$, $cbac$, $babc$, &c. And thus the number of changes in the first case will be 1.—(2. 1) : 2. 1; in the second, 2.—(3. 2. 1) : 2. 1; in the third, 12.—(4. 3. 2. 1) : 2. 1.

Changes
Channa.

If a fifth letter be added, in each series of four quantities, it will beget five *changes*, whence the number of all the *changes* will be $6 \times (5.4.3.2.)1, : 2.1$. Hence if the number of quantities be n , the number of *changes* will be $(n.n-1.n-2.n-3.n-4. \&c.) : 2.1$. From these special formulæ may be collected a general one, *viz.* if n be the number of quantities, and m the number which shews how oft the same quantity occurs; we shall have $(n.n-1.n-2.n-3.n-4.n-5.n-6.n-7.n-8.n-9. \&c.) : m-1.m-2.m-3.m-4. \&c.)$. The series being to be continued, till the continual subtraction of unity from n and m leave 0. After the same manner we may proceed further, till putting n for the number of quantities, and $l, m, r, \&c.$ for the number that shews how oft any of them is repeated, we arrive at an universal form. $(n.n-1.n-2.n-3.n-4.n-5.n-6.n-7.n-8. \&c.) : (l.l-1.l-2.l-3.l-4.l-5. \&c. m.m-1.m-2.m-3. \&c. r.r-1.r-2.r-3.r-4.r-5. \&c.)$.

Suppose, for instance, $n=6, l=3, r=0$. The number of *changes* will be $(6.5.4.3.2.1) : (3.2.1.3.2.1) = (6.5.4) : (3.2.2.5.2=20)$.

Hence, suppose thirteen persons at a table, if it be required how oft they may *change* places; we shall find the number 13.12.11.10.9.8.7.6.5.4.3.2.1. = 6227020800.

In this manner may all the possible anagrams of any word be found in all languages, and that without any study: suppose, *v.g.* it were required to find the anagrams of the word *amor*, the number of *changes* will be

a	e a m	r m o a	m a r o	a r o m
—	a o m	m r o a	m a o r	a o r m
m a	a m o	m o r a	—	a o m r
a m	—	m o a r	r a o m	—
—	r o m a	—	o r a m	r a m o
o m a	o r m a	r m a o	a r m o	a r m o
m o a	o m r a	m r a o	o a m r	a m r o
m a o	o m a r	—	a m o r	—
		r a o m		

The anagrams therefore of the word *amor*, in the Latin tongue, are *roma, mora, maro, ramo, armo*. See ANAGRAM.

Whether this new method of anagramatizing be like to prove of much service to that art, is left to the poets.

CHANNA, in zoology, the name of a fish caught in great plenty in the Mediterranean, and brought to market in Italy and elsewhere, among the sea-perch, which it so nearly resembles, that it would not be distinguishable from it, but that the sea-perch is bigger, and has only broad transverse lines on its back, whereas the channa has them both transverse and longitudinal. It has a very wide mouth, and its lower jaw is longer than its upper; so that its mouth naturally falls open. Its eyes are small, and its teeth very sharp: its back is of a blackish red; it has several longitudinal lines of a reddish hue, and its tail is marked with reddish spots. There is an observation, that in all the fish of this kind which have been examined by naturalists, there have been found none but females. This is as old as the days of Aristotle. Whether this be true in fact, would require many observations. If it should prove so, the whole seems to end in this, that the channa is no distinct species, but only the female

of some other fish. There is another fish not unlike this, called *cannadella*, or rather *channadella*, which at Marseilles is known by the name of *charina*.

CHANNEL, in geography, an arm of the sea, or a narrow sea between two continents, or between a continent and an island. Such are the British channel, St George's channel, the channel of Constantinople, &c.

CHANNELS of a Ship. See CHAIN-WALES.

CHANT, (*cantus*), is used for the vocal music of churches.

In church-history we meet with divers kinds of *chant* or *song*. The first is the *Ambrosian*, established by St Ambrose. The second, the *Gregorian chant*, introduced by Pope Gregory the great, who established schools of chantors, and corrected the church-song. This is still retained in the church under the name of *plain song*: at first it was called the *Roman song*. The *plain* or *Gregorian chant*, is where the choir and people sing in unison, or all together in the same manner.

CHANTILLY, a village in France, about seven leagues from Paris, where there is a magnificent palace and fine forest belonging to the duke of Bourbon.

CHANTOR, a singer of a choir in a cathedral. The word is almost grown obsolete, *chorister* or *singing-man* being commonly used instead of it. All great chapters have chantors and chaplains to assist the canons, and officiate in their absence.

CHANTOR is used by way of excellence for the precentor or master of the choir, which is one of the first dignities of the chapter. At St David's in Wales, where there is no dean, he is next in dignity to the bishop. The ancients called the chantor *prætorinus cantorum*. To him belonged the direction of the deacons and other inferior officers.

Chantors in the temple of Jerusalem, were a number of Levites employed in singing the praises of God, and playing upon instruments before his altar. They had no habits distinct from the rest of the people; yet in the ceremony of removing the ark to Solomon's temple, the chantors appeared dressed in tunics of byssus or fine linen. 2 Chron. v. 12.

CHAUNTRY, or CHANTRY, was anciently a church or chapel endowed with lands, or other yearly revenue, for the maintenance of one or more priests, daily saying or singing mass for the souls of the donors, and such others as they appointed. Hence *chantry-rents* are rents paid to the crown by the tenants or purchasers of *chantry-lands*.

CHAOLGY, the history or description of the chaos. See CHAOS.

Orpheus, in his chaology, sets forth the different alterations, secretions, and divers forms which matter went through till it became inhabitable, which amounts to the same with what we otherwise call *cosmogony*. Dr Burnet, in his theory of the earth, represents the chaos as it was at first, entire, undivided, and universally rude and deformed; or the *tohu bohu*: then shews how it came to be divided into its respective regions; how the homogeneous matter gathered itself apart from all of a contrary principle; and lastly, how it hardened, and became a solid habitable globe. See EARTH.

CHAOS, that confusion in which matter lay when newly

Channel
Chaos.

Chaos
|
Chapelain.

newly produced out of nothing at the beginning of the world, before God, by his almighty word, had put it into the order and condition wherein it was after the six days creation. See EARTH.

CHAOS, in zoology, a genus of insects belonging to the order of vermes zoophyta. The body has no shell or covering, and is capable of reviving after being dead to appearance for a long time: it has no joints or external organs of sensation. There are five species, mostly obtained by infusions of different vegetables in water, and only discoverable by the microscope. See ANIMALCULE.

CHAPÉAU, in heraldry, an ancient cap of dignity worn by dukes, being scarlet-coloured velvet on the outside, and lined with a fur. It is frequently borne above an helmet instead of a wreath, under gentlemen's crests. See HERALDRY, n° 27.

CHAPEL: a place of divine worship, so called. The word is derived from the Latin *capella*. In former times, when the kings of France were engaged in war, they always carried St Martin's hat into the field, which was kept in a tent as a precious relic: from whence the place was called *capella*; and the priests, who had the custody of the tent, *capellani*. Afterwards the word *capella* became applied to private oratories.

In Britain there are several sorts of chapels. 1. Parochial chapels: these differ from parish-churches only in name; they are generally small, and the inhabitants within the district few. If there be a presentation *ad ecclesiam*, instead of *capellani*, and an admission and institution upon it, it is no longer a chapel, but a church. 2. Chapels, which adjoin to and are part of the church: such were formerly built by honourable persons, as burying-places for themselves and their families. 3. Chapels of ease; these are usually built in very large parishes, where all the people cannot conveniently repair to the mother-church. 4. Free chapels; such as were founded by kings of England. They are free from all episcopal jurisdiction, and only to be visited by the founder and his successors; which is done by the lord chancellor: yet the king may license any subject to build and endow a chapel, and by letters patent exempt it from the visitation of the ordinary. 5. Chapels in the universities, belonging to particular colleges. 6. Domestic chapels, built by noblemen or gentlemen for the private service of God in their families. See CHAPLAIN.

Knights of the CHAPEL, called also "Poor knights of Windsor," were instituted by Henry VIII. in his testament. Their number was at first thirteen, but has been since augmented to twenty-six. They assist in the funeral services of the kings of England: they are subject to the office of the canons of Windsor, and live on pensions assigned them by the order of the garter. They bear a blue or red cloak, with the arms of St George on the left shoulder.

CHAPÉLAIN (James), an eminent French poet born at Paris in 1595, and often mentioned in the works of Balzac, Menage, and other learned men. He wrote several works, and at length distinguished himself by an heroic poem called *La Pucelle, ou France Délivrée*, which employed him several years; and which, raising the expectation of the public, was as much derided by some as extolled by others. He was

one of the king's confessors; and died in 1674, very rich, but was very covetous and fordid.

CHAPELET, in the menage, a couple of stirrup-leathers, mounted each of them with a stirrup, and joined at top in a sort of leather buckle, called the head of the chapellet, by which they are made fast to the pommel of the saddle, after being adjusted to the rider's length and bore. They are used both to avoid the trouble of taking up or letting down the stirrups, every time that the gentleman mounts on a different horse and saddle, and to supply the place of the academy saddles, which have no stirrups to them.

CHAPELLE (Claudius Emanuel Luillier,) the natural son of Francis Luillier, took the name of Chapellet from a village between Paris and St Denys, where he was born. He distinguished himself by writing small pieces of poetry, in which he discovered great delicacy, an easy turn, and an admirable facility of expression. He was the friend of Gassendi and Moliere; and died in 1636.

CHAPITERS, in architecture, the same with CAPITALS.

CHAPITERS, in law, formerly signified a summary of such matters as were inquired of, or presented before justices in eyre, justices of assize, or of the peace, in their sessions.

Chapters, at this time, denote such articles as are delivered by the audience of the justice in his charge to the inquest.

CHAPLAIN, an ecclesiastic who officiates in a chapel. See CHAPEL.

The king of Great Britain hath 48 chaplains in ordinary, usually eminent doctors in divinity, who wait four each month, preach in the chapel, read the service to the family, and to the king in his private oratory, and say grace in the absence of the clerk of the closet. Besides, there are 24 chaplains at Whitehall, fellows of Oxford or Cambridge, who preach in their turns, and are allowed 30*l.* *per annum* each. According to a statute of Henry VIII. the persons vested with a power of retaining chaplains, together with the number each is allowed to qualify, is as follows: An archbishop, eight; a duke or bishop, six; a marquis or earl, five; a viscount, four; a baron, knight of the garter, or lord-chancellor, three; a dutches, marchioness, countess, baroness, the treasurer and comptroller of the king's house, clerk of the closet, the king's secretary, dean of the chapel, almoner, and master of the rolls, each of them two; chief justice of the king's bench, and warden of the cinque-ports, each one. All these chaplains may purchase a licence or dispensation, and take two benefices with cure of souls. A chaplain must be retained by letters testimonial under hand and seal; for it is not sufficient that he serve as chaplain in the family.

CHAPLAIN of the *Order of Malta*, otherwise called *diaco*, and *clerk conventual* the second class of the order of Malta. The knights make the first rank.

CHAPELET, an ancient ornament for the head, like a garland or wreath; but this word is frequently used to signify the circle of a crown. There are instances of its being borne in a coat of arms, as well as for crests; the paternal arms for Lascelles are argent, three chapellets, gules.

Chapelet
|
Chaplet.

CHAPLET also denotes a string of beads used by the Roman Catholics, to count the number of their prayers. The invention of it is ascribed to Peter the hermit, who probably learned it of the Turks, as they owe it to the East-Indians.

Chaplets are sometimes called *pater-nosters*; and are made of coral, of diamonds, of wood, &c. The common chaplet contains fifty ave-marias, and five pater-nosters. There is also a chaplet of our Saviour, consisting of 33 beads, in honour of his 33 years living on earth, instituted by father Michael the Camaldulian.

The Orientals have a kind of chaplets which they call *chains*, and which they use in their prayers, rehearsing one of the perfections of God on each link or bead. The Great Mogul is said to have 18 of these chains, all precious stones; some diamonds, others rubies, pearls, &c. The Turks have likewise chaplets, which they bear in the hand, or hang at the girdle: but father Dandini observes, they differ from those used by the Romanius, in that they are all of the same bigness, and have not that distinction into decads; though they consist of six decads, or 60 beads. He adds, that the muslimans run over the chaplet almost in an instant, the prayers being extremely short, as containing only these words, "praise to God," or "glory to God," for each bead. Besides the common chaplet they have likewise a larger one consisting of 100 beads, where there is some distinction, as being divided by little threads into three parts; on one of which they repeat 30 times *subhan Allah*, i. e. "God is worthy to be praised;" on another, *ellamb Allah*, "glory be to God;" and on the third, *Allah echer*, "God is great." These thrice thirty times making only 90; to complete the number 100, they add other prayers for the beginning of the chaplet.—He adds, that the Mahometan chaplet, appears to have had its rise from the *mea veracoth*, or "hundred benedictions;" which the Jews are obliged to repeat daily, and which we find in their prayer-books; the Jews and Mahometans having this in common, that they scarce do any thing without pronouncing some laud or benediction.

Menage derives the word *chaplet* from *chapeau*, "hat." The modern Latins call it *chapellina*, the Italians more frequently *corona*.

CHAPMAN (George), born in 1557, a man highly esteemed in his time for his dramatic and poetic works. He wrote 17 plays; translated Homer and some other ancient poets; and was thought no mean genius. He died in 1634; and was buried in St Giles's in the fields, where his friend Inigo Jones erected a monument to him.

CHAPPE, in heraldry, the dividing an escutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the sections on the sides being of different metal or colour from the rest.

CHAPPEL IN FRITH, a market-town of Derbyshire, about 26 miles north-west of Derby; W. Long. 1. 50. N. Lat. 53. 22.

CHAPPEL (William) a learned and pious bishop of Cork, Cloyne, and Ross, in Ireland, born in Nottinghamshire in 1582. When the troubles began under Char. I. he was prosecuted by the puritan party in parliament; and retired to Derby, where he devoted himself to

study until his death in 1649. He wrote *Methodus Concionandi*, i. e. "the method of preaching;" and is one of those to whom the *Whole Duty of Man* has been attributed. He left behind him also his own life written by himself in Latin, which has been twice printed.

CHAPTER, in ecclesiastical polity, a society or community of clergymen belonging to the cathedrals and collegiate-churches.

It was in the eighth century that the body of canons began to be called a chapter. The chapter of the canons of a cathedral were a standing council to the bishop, and, during the vacancy of the see, had the jurisdiction of the diocese. In the earlier ages, the bishop was head of the chapter; afterwards abbots and other dignitaries, as deans, provosts, treasurers, &c. were preferred to this distinction. The deans and chapters had the privilege of choosing the bishops in England; but Henry VIII. got this power vested in the crown: and as the same price expelled the monks from the cathedrals, and placed secular canons in their room, those he thus regulated were called deans and chapters of the new foundation; such as Canterbury, Winchester, Ely, Carlisle, &c. See **DEAN**.

CHAPTER, in matters in literature, a division in a book for keeping the subject treated of more clear and distinct.

CHAR, in ichthyology, a species of **SALMO**.

CHARABON, a sea-port town on the northern coast of the island of Java in the East-Indies; E. Long. 10. 8. S. Lat. 6.

CHARACTER, in a general sense, signifies a mark, or figure, drawn on paper, metal, stone, or other matter, with a pen, graver, chisell, or other instrument, to signify or denote any thing.

The word is Greek, *χαρακτῆρ*, formed from the verb *χαράσσειν*, *insculpare*, to engrave, impress, &c.

The various kinds of characters may be reduced to three heads, *viz.* *Literal Characters*, *Numeral Characters*, and *Abbreviations*.

1. *Literal CHARACTER*, is a letter of the alphabet, serving to indicate some articulate sound, expressive of some idea or conception of the mind. See **ALPHABET**.

2. These may be divided, with regard to their nature and use, into *Nominal Characters*, or those we properly call *letters*; which serve to express the names of things: See **LETTER**. *Real Characters*; those that instead of names express things and ideas: See **IDEA**, &c. *Emblematical*, or *Symbolical Characters*; which have this in common with real ones, that they express the things themselves; but have this further, that they in some measure personate them, and exhibit their form: such are the hieroglyphics of the ancient Egyptians. See **HIEROGLYPHIC**, **SYMBOL**, &c.

3. *Literal CHARACTERS* may be again divided, with regard to their invention and use, into *particular* and *general* or *universal*.

Particular CHARACTERS, or those peculiar to this or that nation. Such are the Roman, Italian, Greek, Hebrew, Arabic, Gothic, Chinese, &c. characters. See **HEBREW**, **GOthic**, **CHINESE**, &c.

Universal CHARACTERS, are also *real characters*, and make what some authors call a *Philosophical Language*.

That diversity of *characters* used by the several nations to express the same idea, is found the chief obstacle to the advancement of learning: to remove this, several authors have taken occasion to propose plans of *characters* that should be universal, and which each people should read in their own language. The *character* here is to be real, not nominal: to express things and notions; not, as the common ones, letters or sounds: yet to be mute, like letters, and arbitrary; not emblematical, like hieroglyphics.

Thus, every nation should retain its own language, yet every one understand that of each other, without learning it; only by seeing a real or universal *character*, which should signify the same things to all people, by what sounds forever each express it in their particular idiom. For instance, by seeing the *character* destined to signify to *drink*, an Englishman should read to *drink*; a Frenchman, *boire*; a Latin, *bibere*; a Greek, *πινεν*; a Jew, *שָׁוּ*; a German, *trinken*; and so of the rest: in the same manner as seeing a horse, each people expresses it after their own manner; but all mean the same animal.

This real *character* is no chimera; the Chinese and Japanese have already something like it. They have a common *character* which each of those nations understand alike in their several languages; though they pronounce them with such different sounds, that they do not understand one another in speaking.

The first and most considerable attempts for a real *character*, or philosophical language, in Europe, are those of bishop Wilkins, and Dalgarnie: but these, with how much art forever they were contrived, have yet proved ineffectual.

M. Leibnitz had some thoughts the same way; he thinks those great men did not hit the right method. It was probable, indeed, that by their means, people, who do not understand one another, might easily have a commerce together; but they have not hit on true real *characters*.

According to him, the *characters* should resemble those used in algebra: which, in effect, are very simple, yet very expressive; without any thing superfluous or equivocal; and contain all the varieties required.

The real *character* of bishop Wilkins has its just applause: Dr Hook recommends it on his own knowledge and experience, as a most excellent scheme; and to engage the world to the study thereof, publishes some fine inventions of his own therein.

M. Leibnitz tells us, he had under consideration an *alphabet of human thoughts*; in order to a new philosophical language, on his own scheme: but his death prevented its being brought to maturity.

M. Lodwic, in the *philosophical transactions*, gives us a plan of an universal *alphabet* or *character* of another kind: this was to contain an enumeration of all such single sounds, or letters, as are used in any language; by means whereof, people should be enabled to pronounce truly and readily any language; to describe the pronunciation of any language that shall be pronounced in their hearing, so as others accustomed to this language, though they had never heard the language pronounced, shall at first be able truly to pronounce it: and, lastly, this *character* to serve as a stan-

dard to perpetuate the sounds of any language. In the Journal Litteraire, an. 1720, we have a very ingenious project for an universal *character*. The author, after obviating the objections that might be made against the feasibility of such schemes in the general, proposes his own: his *characters* are to be the common Arabic, or numeral figures. The combinations of these nine are sufficient to express distinctly an incredible quantity of numbers, much more than we shall need terms to signify our actions, goods, evils, duties, passions, &c. Thus is all the trouble of framing and learning any new *character* at once saved; the Arabic figures having already all the universality required.

The advantages are immense. For, 1^o, We have here a stable, faithful interpreter; never to be corrupted or changed, as the popular languages continually are. 2^o, Whereas the difficulty of pronouncing a foreign language is such as usually gives the learner the greatest trouble, and there are even some sounds which foreigners never attain to; in the *character* here proposed, this difficulty has no place: every nation is to pronounce them according to the particular pronunciation that already obtains among them. All the difficulty is, the acquainting the pen and the eye to affix certain notions to *characters* that do not, at first sight, exhibit them. But this trouble is no more than we find in the study of any language whatever.

The inflections of words are here to be expressed by the common letters. For instance, the same *character* shall express a *filly*, or a *colt*, a *horse*, or a *mare*, an *old horse*, or an *old mare*, as accompanied with this or that distinctive letter, which shall shew the sex, youth, maturity, or old age: a letter also to express the bigness or size of things; thus, *e. g.* a man with this or that letter, to signify a *great man*, or a *little man*, &c.

The use of these letters belongs to the grammar; which, once well understood, would abridge the vocabulary exceedingly. An advantage of this grammar is, that it would only have one declension, and one conjugation: those numerous anomalies of grammarians are exceeding troublesome; and arise hence, that the common languages are governed by the populace, who never reason on what is best: but in the *character* here proposed, men of sense having the introduction of it, would have a new ground, whereon to build regularly.

But the difficulty is not in inventing the most simple, easy, and commodious *character*, but in engaging the several nations to use it; there being nothing they agree less in, than the understanding and pursuing their common interest.

3. Literal *characters* may again be divided, with respect to the nations among whom they have been invented, into Greek characters, Roman characters, Hebrew characters, &c. The Latin character now used through all Europe, was formed from the Greek, as the Greek was from the Phœnician; and the Phœnician, as well as the Chaldee, Syriac, and Arabic characters, were formed from the ancient Hebrew, which subsisted till the Babylonish captivity; for after that event the character of the Assyrians, which is the square Hebrew now in use, prevailed, the ancient being only found

Characters. found on some Hebrew medals, commonly called Samaritan medals. It was in 1097 that the Gothic characters, invented by Uthlas, were abolished, and the Latin ones established in their room.

Medallists observe, that the Greek character, consisting only of majuscule letters, has preserved its uniformity on all medals, as low as the time of Gallienus; from which time it appears somewhat weaker and rounder: from the time of Constantine to Michael we find only Latin characters: after Michael, the Greek characters recommence; but from that time they began to alter with the language, which was a mixture of Greek and Latin. The Latin medals preserve both their character and language as low as the translation of the seat of the empire to Constantinople: towards the time of Decius the character began to lose its roundness and beauty; some time after, it retrieved, and subsisted tolerably till the time of Justin, when it degenerated gradually into the Gothic. The rounder, then, and better formed a character is upon a medal, the fairer pretence it has to antiquity.

II. **Numeral CHARACTERS**, or characters used to express numbers, are either letters or figures.

The Arabic character, called also the common one, because it is used almost throughout Europe in all sorts of calculations, consists of these ten digits 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

The Roman numeral character consists of seven majuscule letters of the Roman alphabet, viz. I, V, X, L, C, D, M. The I denotes one, V five, X ten, L fifty, C a hundred, D five hundred, and M a thousand. The I repeated twice makes two, II; thrice, three, III; four is expressed thus IV, as I before V or X takes an unit from the number expressed by these letters. To express six, an I is added to a V, VI; for seven, two, VII: and for eight, three, VIII. nine is expressed by an I before X, thus IX. The same remark may be made of the X before L or C, except that the diminution is by tens; thus, XL denotes forty, XC ninety, and LX sixty. The C before D or M diminishes each by a hundred. The number five hundred is sometimes expressed by an I before a C inverted, thus, IC; and instead of M, which signifies a thousand, an I is sometimes used between two Cs, the one direct, and the other inverted, thus CIO. The addition of C and O before or after raises, CIO by tens, thus, CCIOO expresses ten thousand, CCCIOOO, a hundred thousand. The Romans also expressed any number of thousands by a line drawn over any numeral less than a thousand; thus \overline{V} denotes five thousand, \overline{LX} , sixty thousand: so likewise \overline{M} is one million, \overline{MM} is two millions, &c.

The Greeks had three ways of expressing numbers: 1. Every letter, according to its place in the alphabet, denoted a number, from α , one, to ω , twenty-four. 2. The alphabet was divided into eight units, α one, β two, γ three, &c.; into eight tens, ι ten, κ twenty, λ thirty, &c.; and eight hundreds, ρ one hundred, σ two hundred, τ three hundred, &c. 3. I stood for one, II five, Δ ten, H a hundred, X a thousand, M ten thousand; and when the letter II inclosed any of these, except I, it shewed the inclosed letter to be

five times its value; as $\overline{\Delta}$ fifty, \overline{H} five hundred, \overline{X} five thousand, \overline{M} fifty thousand.

The French CHARACTER used in the chamber of accounts, and by persons concerned in the management of the revenue, is, properly speaking, nothing else than the Roman numerals, in letters that are not majuscule: thus, instead of expressing fifty-six by LVI, they denote it by smaller characters lvj.

III. **CHARACTERS of Abbreviations, &c.** in several of the arts, are symbols contrived for the more concise and immediate conveyance of the knowledge of things. For the

CHARACTERS used in Algebra. See ALGEBRA, sect. i.

CHARACTERS used in Astronomy, viz.

Of the Planets. See Plate XLIII. fig. 5.

Of the Signs. *Ibid.* fig. 3.

Of the aspects.

\oslash or S Conjunction	Δ Trine
SS Semifextile	Bq Biquintile
* Sextile	Vc Quincunx
Q Quintile	\circ Opposition
\square Quartile	\odot Dragon's head
Td Tredecile	\odot Dragon's tail

Of time.

A. *ante meridiem*, before the sun comes upon the meridian.

O. or N. noon.

P. *post meridiem*, when the sun is past the meridian.

CHARACTERS in Commerce.

D \circ ditto, the same	R \circ recto } <i>folio</i>
N \circ numero, or number	V \circ vero }
F \circ folio, or page	
C or H hundred	£ . or l . pounds sterling
weight, or 112 pounds	pr . per, or by, as pr ann . by the year, pr cent .
q rs quarters	R x rixdollar
S or s shillings	D t ducat
d pence or deniers	P. S. postscript, &c.
lb pound weight.	

CHARACTERS in Chemistry. See Plate LXXVI.

CHARACTERS in Geometry and Trigonometry.

the character of parallelism	\sphericalangle equiangular, or similar
Δ triangle	\perp equilateral
\square square	\sphericalangle an angle
\square rectangle	\sphericalangle right angle
\odot circle	\perp perpendicular

\circ denotes a degree; thus 45° implies 45 degrees.

\prime Denotes a minute; thus, 50, is 50 minutes. " "

" Denote seconds, thirds, and fourths: and the same characters are used where the progressions are by tens, as it is here by sixties.

CHARACTERS in Grammar, Rhetoric, Poetry, &c.

() parenthesis	D. D. doctor in divinity
[] crotchet	V. D. M. minister of the word of God
- hyphen	LL. D. doctor of laws
' apostrophe	J. V. D. doctor of civil and canon law
' emphasis or accent	" quotation
" breve	
" dialysis	
^ caret and circumflex.	

† ‡ and

Character.

† ‡ and * references
 ¶ section or division
 ¶ paragraph

F. R. S. fellow of the royal society.

For the other characters used in grammar, see
 COMMA, COLON, SEMICOLON, &c.

CHARACTERS among the ancient Lawyers, and in an-
 cient Inscriptions.

¶ paragraphs
 ff digests
 Scto. senatus con-
 sulto
 E. extra
 S. P. Q. R. sena-
 tus populūque
 Romanus

CHARACTERS in Medicine and Pharmacy.

R. recipe
 ā, āā, or ana, of each
 alike
 lb a pound, or a pint
 3 an ounce
 3 a drachm
 3 a scruple
 gr. grains
 1/2 or 1/3, half of any
 thing.
 cong. congius, a gallon
 coch. cochleare, a
 spoonful

P. P. pater patriz
 C. code
 C. C. consules
 T. titulus.
 P. P. D. D. propria
 pecunia dedicavit
 D. D. M. dono dedit
 monumentum.
 M. manipulus, a
 handful
 P. a pugil
 P. Æ. equal quan-
 tities
 S. A. According to
 art
 q. s. a sufficient
 quantity
 q. pl. as much as
 you please
 P. P. pulvis patrum,
 the Jesuit's bark.

CHARACTERS upon Tomb-Stones.

S. V. Siste viator, i. e. Stop traveller.
 M. S. Memorizæ sacrum, i. e. Sacred to the me-
 mory.
 D. M. Disiis manibus.
 I. H. S. Jesus.
 X. P. a character found in the catacombs, about
 the meaning of which authors are not agreed.

CHARACTERS used in Music, and of musical Notes with
 their proportions, are as follow.

♩ character of a large	8	♩ crotchet	$\frac{1}{2}$
♪ a long	4	♪ quaver	$\frac{1}{4}$
♫ a breve	2	♫ semiquaver	$\frac{1}{8}$
♬ a semibreve	1	♬ demisemiquaver	$\frac{1}{16}$
♭ a minim	$\frac{1}{2}$		

character of a sharp note: this character at the
 beginning of a line or space, denotes that all the notes
 in that line are to be taken a semitone higher than in
 the natural series; and the same affects all the octaves
 above and below, though not marked: but when pre-
 fixed to any particular note, it shews that note alone
 to be taken a semitone higher than it would be with-
 out such character.

b or b, character of a flat note: this is the contra-
 ry to the other above; that is, a semitone lower.

h character of a natural note: when in a line or
 series of artificial notes, marked at the beginning b or
 #, the natural note happens to be required, it is de-
 noted by this character.

♯ character of the treble cliff.

♭ character of the mean cliff.

♮ bass cliff.

2, or 4 characters of common duple time, signify-
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ing the measure of two crotchets to be equal to two
 notes, of which four make a semibreve.

C ♯ ♭, characters that distinguish the move-
 ments of common time, the first implying slow, the
 second quick, and the third very quick.

$\frac{1}{2}$, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{1}{4}$, characters of simple triple time,
 the measure of which is equal to three semibreves, or
 to three minims.

$\frac{4}{8}$, $\frac{6}{8}$, or $\frac{6}{4}$, characters of mixed triple time, where
 the measure is equal to six crotchets, or six qua-
 vers.

$\frac{9}{8}$ or $\frac{3}{2}$, or $\frac{9}{16}$, or $\frac{3}{4}$, or $\frac{3}{8}$, characters of compound
 triple time.

$\frac{1}{12}$, $\frac{8}{12}$, $\frac{1}{6}$, or $\frac{1}{3}$, or $\frac{1}{4}$, characters of that spe-
 cies of triple time called the measure of twelve times.

CHARACTER, in epic and dramatic poetry, that
 which is peculiar in the manners of any person, and
 distinguishes him from all others.

The poetical character, says Mr Boswell, is not pro-
 perly any particular virtue or quality, but a compo-
 sition of several which are mixed together, in a diffe-
 rent degree, according to the necessity of the fable and
 the unity of the action: there must be one, however,
 to reign over all the rest; and this must be found, in
 some degree, in every part. The first quality in
 Achilles, is wrath; in Ulysses, dissimulation; and in
 Æneas, mildness: but as these characters cannot be
 alone, they must be accompanied with others to em-
 bellish them, as far as they are capable, either by
 hiding their defects, as in the anger of Achilles, which
 is palliated by extraordinary valour; or by making
 them center in some solid virtue, as in Ulysses, whose
 dissimulation makes a part of his prudence; and in
 Æneas, whose mildness is employed in a submission to
 the will of the gods. In the making up of which
 union, it is to be observed, the poets have joined to-
 gether such qualities as are by nature the most com-
 patible; valour with anger, piety with mildness, and
 prudence with dissimulation. The fable requires pru-
 dence in Ulysses, and piety in Æneas; in this, there-
 fore, the poets were not left to their choice: but Ho-
 mer might have made Achilles a coward without a-
 bating any thing from the justness of his fable: so that
 it was the necessity of adorning his character that
 obliged him to make him valiant: the character, then,
 of a hero in the epic poem, is compounded of three
 sorts of qualities; the first essential to the fable; the
 second, embellishments of the first; and valour, which
 sustains the other two, makes the third.

Unity of character is as necessary as the unity of
 the fable. For this purpose a person should be the
 same from the beginning to the end: not that he is
 always to betray the same sentiments, or one passion;
 but that he should never speak nor act inconsistently
 with his fundamental character. For instance, the
 weak may sometimes fall into a warmth, and the
 break of the passionate be calm, a change which of-
 ten introduces in the drama a very affecting variety;
 but if the natural disposition of the former was to be
 represented as boisterous, and that of the latter mild
 and soft, they would both act out of character, and
 contradict their persons.

True characters are such as we truly and really see
 in men, or may exist without any contradiction to
 nature:

R r

nature:

Character.

Character. nature: no man questions but there have been men as generous and as good as *Æneas*, as passionate and as violent as *Achilles*, as prudent and wife as *Ulysses*, as impious and atheistical as *Mezentius*, and as amorous and passionate as *Dido*; all these characters, therefore, are true, and nothing but just imitations of nature. On the contrary, a character is false when an author foigns it, that one can see nothing like it in the order of nature wherein he designs it shall stand: these characters should be wholly excluded from a poem, because, transgressing the bounds of probability and reason, they meet with no belief from the readers; they are fictions of the poet's brain, not imitations of nature; and yet all poetry consists in an imitation of nature.

CHARACTER is also used for certain visible qualities, which claim respect or reverence to those vested therewith.—The majesty of kings gives them a *character* which procures respect from the people. A bishop should sustain his *character* by learning and solid piety, rather than by worldly lustre, &c. The law of nations secures the *character* of an ambassador from all insults.

CHARACTERS, among botanists, is synonymous with the definition of the genera of plants.—The term *character* is not extended by Linnæus to the species of plants, because he never gives the complete description of any species; but only enumerates those characters or circumstances in which it differs from all the other species of the same genus. The characters which are known by the sense of sight, are only to be depended on in distinguishing bodies; those which are acquired by the other senses, as the taste and smell, being rarely or never to be admitted as marks of distinction. The characteristic mark of each genus is to be fixed from the figure, situation, connection, number, and proportion, of all the parts*. Linnæus has suggested four different characters; the artificial, the natural, and the habitual; which are all equally applicable to the higher and lower divisions. The first is drawn indiscriminately from different parts of the plant, and admits of more or fewer characteristic marks than are absolutely necessary for distinguishing the classes, genera, and species. Linnæus establishes for a criterion of the artificial character, that it can never distinguish the genera in a natural order; being calculated merely for discriminating such as arrange themselves under the same artificial order. In the sexual system the classical characters are only considered as artificial. The essential character distinguishes one plant from another by means of a single mark so striking and particular as to distinguish the plant in which it is found, from every other, at first sight. It serves to distinguish such genera as arrange themselves under the same natural order. The essential character of the classes and genera ought to be taken from one of the seven parts of fructification; that of the species from any of the other parts; as the stem, leaf, root, buds, &c. The natural character includes the two former, and collects all the possible marks of plants. It is useful, says Linnæus, in every method; lays the foundation of the system; remains unchanged though new genera are daily discovered; and is capable of emendation by the detection of new spe-

cies alone which afford an opportunity of excluding such characteristical marks as are totally superfluous. The habitual character drawn from the habit or port of plants, was the invention of the earlier botanists who knew no better rule for the distribution of vegetables. This character has never been employed but in distinguishing the species; though Linnæus seems to think that it may be used with caution, and in default of other characters, for ascertaining the genera. See **BOTANY**.

CHARACTERISTIC, in the general, is that which *characterizes* a thing, or person, *i. e.* constitutes its *character*, whereby it is distinguished. See **CHARACTER**.

CHARACTERISTIC, is peculiarly used in grammar, for the principal letter of a word: which is preserved in most of its tenes and moods, its derivatives and compounds.

CHARACTERISTIC of a *Logarithm*, is its index or exponent. See **LOGARITHM**.

CHARACTERISTIC Triangle of a *Curve*, in the higher geometry, is a rectilinear right-angled triangle, whose hypotenuse makes a part of the curve, not sensibly different from a right line. It is so called, because curve lines are used to be distinguished hereby. See **CURVE**.

CHARADE, the name of a new species of composition or literary amusement. It owes its name to the idler who invented it. Its subject must be a word of two syllables, each forming a distinct word; and these two syllables are to be concealed in an enigmatical description, first separately, and then together. The exercise of charades, if not greatly instructive, is at least innocent and amusing. At all events, as it has made its way into every fashionable circle, and has employed even Garrick, it will scarcely be deemed unworthy of attention. The silliness indeed of most that have appeared in the papers under this title, are not only destitute of all pleantry in the stating, but are formed in general of words utterly unfit for the purpose. They have therefore been treated with the contempt they deserved. In trifles of this nature, inaccuracy is without excuse. The following examples therefore are at least free from this blemish.

I.

My *first*, however here abused,
 Designs the sex alone;
 In Cambria, such is custom's pow'r,
 'Tis Jenkin, John, or Joan.
 My *second* oft is loudly call'd,
 When men prepare to sit it:
 It's name delights the female ear;
 Its force, may none resist it!
 It binds the weak, it binds the strong,
 The wealthy and the poor;
 Still 'tis to joy a passport deem'd,
 For sullied fame a cure.
 It may insure an age of bliss,
 Yet mil'ries oft attend it;
 To fingers, ears, and noses too,
 Its various lords commend it.
 My *whole* may chance to make one drink,
 Though vendid in a fish-shop;
 'Tis now the monarch of the seas,
 And has been an archbishop.

Her-ring.
 My

* See Botanical Table.

Charade

II.

Charadrius.

My *first*, when a Frenchman is learning English, serves him to swear by. My *second*, is either hay or corn. My *whole*, is the delight of the present age, and will be the admiration of posterity. *Gar-rich*.

III.

My *first*, is plowed for various reasons, and grain is frequently buried in it to little purpose. My *second*, is neither riches nor honours; yet the former would generally be given for it, and the latter is often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. *Sea-sun*.

IV.

My *first*, with the most rooted antipathy to a Frenchman, prides himself, whenever they meet, upon sticking close to his jacket. My *second* has many virtues, nor is it its least that it gives name to my *first*. My *whole*, may I never catch! *Tar-tar*.

V.

My *first* is one of England's prime boasts; it rejoices the ear of a horse, and anguishes the toe of a man. My *second*, when brick, is good, when stone, better; when wooden, best of all. My *whole* is famous alike for rottenness and tin. *Corn-wall*.

VI.

My *first* is called bad or good,
May pleasure or offend ye;
My *second*, in a thirsty mood,
May very much besfriend ye.
My *whole*, tho' styled "a cruel word,"
May yet appear a kind one;
It often may with joy be heard,
With tears may often blind one. *Fare-well*.

VII.

My *first* is equally friendly to the thief and the lover, the toper, and the student. My *second* is light's opposite: yet they are frequently seen hand in hand; and their union, if judicious, gives much pleasure. My *whole*, is tempting to the touch, grateful to the sight, fatal to the taste. *Night-shade*.

CHARADRIUS, in ornithology, a genus belonging to the order of grallæ. The beak is cylindrical and blunt; the nostrils are linear; and the feet have three toes. There are 12 species, *viz*.

1. The *Hiaticula*, or Sea-lark of Ray, has a black breast; a white streak along the front; the top of the head is brown; and the legs and beak are reddish. It is found on the shores of Europe and America. They frequent our shores in the summer, but are not numerous. They lay four eggs, of a dull whitish colour, sparingly sprinkled with black: at approach of winter they disappear.

2. The *Alexandrinus*, or Alexandrian Dotterel, is of a brownish colour, with the forehead, collar, and belly white; the prime tail-feathers on both sides are white; and the legs are black. It is about the size of a lark, and lives upon insects.

3. The *Vociferus*, or Noisy Plover of Cateby, has black streaks on the breast, neck, forehead, and cheeks; and the feet are yellow. It is a native of North America.

4. The *Ægyptius* has a black streak on the breast, white eye-brows, the prime tail-feathers streaked with black at the points, and bluish legs. It is found in the plains of Egypt, and feeds on insects.

5. The *Morinellus* has an iron-coloured breast, a small white streak on the breast and eye-brows, and black legs. It is the Dotterel of Ray, and a native of Europe. They are found in Cambridgeshire, Lincolnshire, and Derbyshire: on Lincoln-heath, and on the moors of Derbyshire, they are migratory; appearing there in small flocks of eight or ten only in the latter end of April, and stay there all May and part of June, during which time they are very fat, and much esteemed for their delicate flavour. In the months of April and September, they are taken on the Wiltshire and Berkshire downs: they are also found in the beginning of the former month on the sea-side at Mcale in Lancashire, and continue there about three weeks, attending the barley fallows: from thence they remove northward to a place called *Leyton Hawi*, and stay there about a fortnight; but where they breed, or where they reside during the winter, we have not been able to discover. They are reckoned very foolish birds, so that a dull fellow is proverbially styled a *dotterel*. They were also believed to mimic the action of the fowler, to stretch out a wing when he stretches out an arm, &c. continuing their imitation, regardless of the net that is spreading for them.

To this method of taking them, Michael Drayton alludes in his panegyrical verses on *Coryate's Crudities*:

Most worthy man, with thee it is ev'n thus,
As men take *dotterels*, so hast thou ta'en us;
Which as a man his arm or leg doth set,
So this fond bird will likewise counterfeit.

At present sportsmen watch the arrival of the dotterels, and shoot them; the other method having been long disused.

6. The *Apricarius* has a black belly; the body is brown, and variegated with white and yellow spots; and the legs are ash-coloured. It is the spotted Plover of Edwards, and a native of Canada.

7. The *Pluvialis* is black above, with green spots, white underneath, and the feet are ash-coloured. It is the green Plover of Ray, and is a native of Europe. They lay four eggs, sharply pointed at the lesser end, of a dirty white colour, and irregularly marked, especially at the thicker end, with blotches and spots. It breeds on several of our unfrequented mountains; and is very common on those of the isle of Rum, and others of the loftier Hebrides. They make a shrill whistling noise; and may be enticed within shot by a skilful imitator of the note.

8. The *Torquatus* has a black breast, and a white front; the top of the head and the collar is black; and the beak and feet are bluish. It is a native of St Domingo.

9. The *Calidris* has black feet, and a black bill; the rump is greyish; and the body is pure white below. It frequents the shores of Europe.

10. The *Ædicnemus*, or Stone-curlew of Ray, is of a grey colour, with two of the prime wing-feathers black, but white in the middle; it has a sharp bill, and ash-coloured feet; and is about the size of a crow. In Hampshire, Norfolk, and on Lincoln-heath, it is

Charaims
|
Charcoal.

called the stone-curler, from a similarity of colours to the curler. It breeds in some places in rabbit-burrows; also among stones on the bare ground, laying two eggs of a copper colour spotted with a darker red. The young run soon after they are hatched. These birds feed in the night on worms and caterpillars: they will also eat toads, and will catch mice. They inhabit fallow lands and downs; affect dry places, never being seen near any waters. When they fly, they extend their legs straight out behind: are very shy birds; run far before they take to wing; and often squat: are generally seen single; and are esteemed very delicate food. — Hasselquist informs us, that this bird is also "met with in Lower Egypt, in the Acacia groves, near the villages Abufir and Sackhara, near the sepulchres of the ancient Egyptians, and in the deserts. The Arabians call it Kervan. It has a shrill voice, somewhat resembling that of the black woodpecker which it raises and lowers successively, uttering agreeable notes. The Turks and Egyptians value it much if they can get it alive; and keep it in a cage for the sake of its singing. Its flesh is hard, and of a very good taste, inclined to aromatic. It is a very voracious bird, catching and devouring rats and mice, which abound in Egypt. It seldom drinks; and when taken young, and kept in a cage in Egypt, they give it no water for several months, but feed it with fresh meat macerated in water, which it devours very greedily. It is found in deserts, and is therefore accustomed to be without water.

11. The Himantopus is white below, with a black back, and a long black bill; the feet are red, and very long. It is the autumnal dotterel of the English authors, and frequents the sea-shores of Europe. It is also found in the lakes of Egypt in the month of October.

12. The Spinus, armed Dotterel, or Lapwing, has a black breast, legs, and wings; it has a crest on the hinder part of the head. It is of the size of a pigeon; the French call it *dominicanus*, from the resemblance it has to the dress of a Dominican monk. It is a native of Egypt.

CHARAIMS, a sect of the Jews in Egypt. They live by themselves, and have a separate synagogue; and as the other Jews are remarkable for their eyes, so are those for their large noses, which run through all the families of this sect. These are the ancient Essenes. They strictly observe the five books of Moses, according to the letter; and receive no written traditions. It is said that the other Jews would join the Charaims; but those not having observed the exact rules of the law with regard to divorces, these think they live in adultery.

CHARANTIA, in botany. See MOMORDICA.

CHARBON, in the menage, that little black spot or mark which remains after a large spot in the cavity of the corner teeth of a horse: about the seventh or eighth year when the cavity fills up, the tooth being smooth and equal, it is said to be rased.

CHARCAS, the southern division of Peru in South America, remarkable for the silver mines of Potosi.

CHARCOAL, a sort of artificial coal, or fuel, consisting of wood half burnt; chiefly used where a clear strong fire, without smoke, is required; the humidity

of the wood being here mostly dissipated, and exhaled in the fire wherein it is prepared.

The microscope discovers a surprising number of pores in charcoal: they are diffused in order, and traverse it lengthwise; so that there is no piece of charcoal, how long soever, but may be easily blown through. If a piece be broken pretty short, it may be seen through with a microscope. In a range the 18th part of an inch long, Dr Hook reckoned 150 pores; whence he concludes, that in a charcoal of an inch diameter, there are not less than 5,724,000 pores. It is to this prodigious number of pores, that the blackness of charcoal is owing: for the rays of light striking on the charcoal, are received and absorbed in its pores, instead of being reflected; whence the body must of necessity appear black, blackness in a body being no more than a want of reflection. Charcoal was anciently used to distinguish the bounds of estates and inheritances; as being incorruptible, when let very deep within ground. In effect, it preserves itself so long, that there are many pieces found entire in the ancient tombs of the northern nations. M. Dodart says, there is charcoal made of corn, probably as old as the days of Cæsar: he adds, that it has kept so well, that the wheat may be still distinguished from the rye; which he looks on as a proof of its incorruptibility.

The operation of charring wood, is performed in the following manner: The wood intended for this purpose is cut into proper lengths, and piled up in heaps near the place where the charcoal is intended to be made: when a sufficient quantity of wood is thus prepared, they begin constructing their stacks, for which there are three methods. The first is this: They level a proper spot of ground, of about twelve or fifteen feet in diameter, near the piles of wood; in the center of this area a large billet of wood, split across at one end and pointed at the other, is fixed with its pointed extremity in the earth, and two pieces of wood inserted through the clefts of the other end, forming four right-angles; against these cross pieces four other billets of wood are placed, one end on the ground, and the other leaning against the angles.

This being finished, a number of large and straight billets are laid on the ground to form a floor, each being as it were the radius of the circular area: on this floor a proper quantity of brush or small wood is strewed, in order to fill up the interstices, when the floor will be complete; and in order to keep the billets in the same order and position they were first arranged, pegs or flumps are driven into the ground in the circumference of the circle, about a foot distant from one another: upon this floor a stage is built with billets set upon one end, but something inclining towards the central billet; and on the tops of these another floor is laid in a horizontal direction, but of shorter billets, as the whole is, when finished, to form a cone.

The second method of building the stacks for making charcoal is performed in this manner: A long pole is erected in the center of the area above described, and several small billets ranged round the pole on their ends: the interstices between these billets and the pole is filled with dry brush-wood, then a floor is laid, on that a stage in a reclining position, and on that a second

Charenel.

Charcoal.

Charcoal.

cond floor, &c. in the same manner as described above; but in the lower floor there is a billet larger and longer than the rest, extending from the central pole to some distance beyond the circumference of the circle.

The third method is this: A chimney, or aperture of a square form, is built with billets in the center, from the bottom to the top; and round these, floors and inclined stages are erected, in the same manner as in the stacks above described, except that the base of this, instead of being circular like the others, is square; and the whole stack, when completed, forms a pyramid.

The stack of either form being thus finished, is covered over with turf, and the surface plastered with a mixture of earth and charcoal-dust well tempered together.

The next operation is the setting the stack on fire. In order to this, if it be formed according the first construction, the central billet in the upper stage is drawn out, and some pieces of very dry and combustible wood are placed in the void space, called, by workmen, the chimney, and fire set to these pieces. If the stack be built according to the second construction, the central pole is drawn out, together with the large horizontal billet above described; and the void space occupied by the latter being filled with pieces of very dry combustible wood, the fire is applied to it at the base of the stack. With regard to the third construction, the square aperture or chimney is filled with small pieces of very dry wood, and the fire applied to it at the top or apex of the pyramidal stack. When the stack is set on fire, either at the top or bottom, the greatest attention is necessary in the workman; for in the proper management of the fire the chief difficulty attending the art of making good charcoal consists. In order to this, care is taken, as soon as the flame begins to issue some height above the chimney, that the aperture be covered with a piece of turf, but not so close as to hinder the smoke from passing out: and whenever the smoke appears to issue very thick from any part of the pile, the aperture must be covered with a mixture of earth and charcoal dust. At the same time time, as it is necessary that every part of the stack should be equally burnt, it will be requisite for the workman to open vents in one part and shut them in another. In this manner the fire must be kept up till the charcoal be sufficiently burnt, which will happen in about two days and a half, if the wood be dry; but if green, the operation will not be finished in less than three days. When the charcoal is thought to be sufficiently burnt, which is easily known from the appearance of the smoke, and the flames no longer issuing with impetuosity through the vents; all the apertures are to be closed up very carefully with a mixture of earth and charcoal-dust, which, by excluding all access of the external air, prevents the coals from being any further consumed, and the fire goes out of itself. In this condition it is suffered to remain, till the whole is sufficiently cooled; when the cover is removed, and the charcoal is taken away. If the whole process is skilfully managed, the coals will exactly retain the figure of the pieces of wood: some are said to have been so dextrous, as to char an arrow without altering even the figure of the feather.

There are considerable differences in the coals of different vegetables, in regard to their habitude to fire: the very light coals of linen, cotton, fume fungi, &c. readily catch fire from a spark, and soon burn out; the more dense ones of woods and roots are set on fire more difficultly, and burn more slowly: the coals of the black berry-bearing alder, of the hazel, the willow, and the lime-tree, are said to answer best for the making of gunpowder and other pyrotechnical compositions, perhaps from their being easily inflammable: for the reduction of metallic calces those of the heavier woods, as the oak and the beech, are preferable, these seeming to contain a larger proportion of the phlogistic principle, and that, perhaps, in a more fixed state: considered as common fuel, those of the heavy woods give the greatest heat, and require the most plentiful supply of air to keep them burning; those of the light woods preserve a glowing heat, without much draught of air, till the coals themselves are consumed; the bark commonly crackles and flies about in burning, which the coal of the wood itself very seldom does.

Mathematical-instrument makers, engravers, &c. find charcoal of great use to polish their brass, and copper-plates after they have been rubbed clean with powdered pumice-stone. Plates of horn are polishable in the same way, and a gloss may be afterwards given with tripoli.

The coals of different substances are also used as pigments; hence the bone-black, ivory-black, &c. of the shops. Most of the paints of this kind, besides their incorruptibility, have the advantage of a full colour, and work freely in all the forms in which powdery pigments are applied; provided they have been carefully prepared, by thoroughly burning the subject in a close vessel, and afterwards grinding the coal into a powder of due fineness. Pieces of charcoal are used also in their entire state for tracing the outlines of drawings, &c.; in which intention they have an excellence, that their mark is easily wiped out. For these purposes, either the finer pieces of common charcoal are picked out and cut to a proper shape; or the pencils are formed of wood, and afterwards burnt into charcoal in a proper vessel well covered. The artists commonly make choice of the smaller branches of the tree freed from the bark and pith; and the willow and vine are preferred to all others. This choice is confirmed by the experiments of Dr Lewis, who has found that the wood of the trunks of trees produces charcoal of a harder nature than their small twigs or branches; and the hard woods, such as box and guaiacum, produced coals very sensibly harder than the softer woods. Willow he prefers to all others. The shells and stones of fruits yielded coals so hard that they would scarce mark on paper at all; while the coals of the kernels of fruits were quite soft and mellow. The several coals produced by the doctor's experiments, were levigated into fine powder, mixed both with gum-water and oil, and applied as paints both thin and thick, and diluted with different degrees of white. All of them, when laid on thick, appeared of a strong full black, nor could it be judged that one was of a finer colour than another; diluted with white, or when spread thin, they had all somewhat of a bluish cast.

*Philosophy.
Commence
of Arts.*

Horns,

Chardin
||
Charge.

Horns, and the bones both of fishes and land-animals, gave coals rather glossier and deeper-coloured than vegetables; and which, in general, were very hard, so as difficulty, or not at all, to stain paper. Here also the hardnels of the coal seemed to depend on that of the subject from whence it was prepared; for silk, woollen, leather, blood, and the fleshy parts of animals, yielded soft coals. Some of these differed from others very sensibly in colour: that of ivory is superior to all the rest, and undistubably the finest of all the charcoal blacks. The animal coals had much less of the bluish cast in them than the vegetable, many of them inclining rather to a brown. Charred pit-coal, on the other hand, seemed to have this blueness in a greater degree.

Charcoal is not soluble in any of the acids; but may be dissolved in considerable quantities by a solution of *hyper sulphuris*, to which it communicates a green colour. Melted with colourless fritts or glasses, it gives a pale yellow, dark yellow, reddish, brownish, or blackish colour, according as the inflammable matter is in greater or less proportion; as the phlogiston, or inflammable matter of the coal, seeming to be the direct tinging substance. When the phlogistic matter is thus diffused through glass, it is no more affected by continued strong fire than charcoal is when excluded from the air.

The vapour of burning charcoal is found to be highly noxious, being no other than *fixed air*. How this affects the animal system is explained under the article *Blood*, n° 30, 3r.

CHARDIN (Sir John), a celebrated traveller, was born at Paris in 1642. His father, who was a jeweller, had him educated in the Protestant religion; after which he travelled into Persia and India. He traded in jewels, and died at London in 1713. The account he wrote of his travels is much esteemed.

CHARENTON, the name of two towns of France, the one upon the Marmaude in the Bourbonnois; the other in the isle of France, near the confluence of the Marne with the Seine.

CHARES the Lydian, a celebrated statuary, was the disciple of Lyfippus; and made the famous Colossus of the sun in the city of Rhodes. Flourished 288 years before Christ.

CHARGE, in gunnery, the quantity of powder and ball wherewith a gun is loaded for execution.

The rules for charging large pieces in war are, That the piece be first cleaned or scoured within: that the proper quantity of powder be next driven in and rammed down; care, however, being taken, that the powder, in ramming, be not bruised, because that weakens its effect: that a little quantity of paper, hay, lint, or the like, be rammed over it; and that the ball or shot be intruded. If the ball be red-hot, a tompon, or trencher of green wood, is to be driven in before it. The common allowance for a charge of powder of a piece of ordnance, is half the weight of the ball. In the British navy, the allowance for 32 pounders is but seven sixteenths of the weight of the bullet. But a late author is of opinion, that if the powder in all ship cannon whatever, was reduced to one-third weight of the ball, or even less, it would be of considerable advantage, not only by saving ammunition, but by keep-

ing the guns cooler and quieter, and at the same time more effectually injuring the vessels of the enemy. With the present allowance of powder the guns are heated, and their tackle and furniture strained; and this only to render the bullets less efficacious: for a bullet which can but just pass through a piece of timber, and loses almost all its motion thereby, has a much better chance of rending and fracturing it, than if it passes through with a much greater velocity.

CHARGE, in heraldry, is applied to the figures represented on the escutcheon, by which the bearers are distinguished from one another; and it is to be observed, that too many charges are not so honourable as fewer.

CHARGE of Lead, denotes a quantity of 36 pgs. See *FIG.*

CHARGE to enter Heir, in Scots law, a writing passing under the signet, obtained at the instance of a creditor, either against the heir of his debtor, for fixing upon him the debt as representing the debtor, which is called a general charge: or, against the debtor himself, or his heir, for the purpose of vesting him in the right of any heritable subject to which he has made up no title, in order the creditor may attach that subject for payment of his debt, in the same manner as if his debtor or his heir were legally vested in it by service or otherwise. This last kind is called a *special charge*.

CHARGED, in heraldry, a shield carrying someimpresa or figure, is said to be charged therewith; so also, when one bearing, or charge, has another figure added upon it, it is properly said to be charged.

CHARGED, in electrical experiments, is when a vial, pane of glass, or other electric substance, properly coated on both sides, has a quantity of electricity communicated to it; in which case the one side is always electrified positively, and the other negatively.

CHARIOT, a half coach, having only a seat behind, with a stool, at most, before. See *СОАЩ*.

The chariots of the ancients, chiefly used in war, were called by the several names *bigea*, *trigæ*, &c. according to the number of horses applied to draw them. Every chariot carried two men, who were probably the warrior and the charioteer; and we read of several men of note and valour employed in driving the chariot. When the warriors came to encounter in close fight, they alighted out of the chariot, and fought on foot; but when they were weary, which often happened by reason of their armour, they retired into their chariot, and thence annoyed their enemies with darts and missive weapons. These chariots were made so strong, that they lasted for several generations.

Besides this sort, we find frequent mention of the *currus falcati*, or those chariots armed with hooks, or scythes, with which whole ranks of soldiers were cut off together, if they had not the art of avoiding the danger; these were not only used by the Persians, Syrians, Egyptians, &c. but we find them among the ancient Britons; and notwithstanding the imperfect state of some of the most necessary arts among that nation before the invasion of the Romans, it is certain that they had war-chariots in great abundance. By the Greek and Roman historians, these chariots are described by the
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Charge
||
Chariot.

Robins's
Proposal for
increasing
the Strength
of the Navy.

Chariots
I
Chariota.

six following names; *viz.* Benna, Petoritum, Currus or Carrus, Covinus, Effedum, and Rheda. The benna seems to have been a chariot designed rather for travelling than war. It contained two persons, who were called *combenones*, from their sitting together in the same machine. The petoritum seems to have been a larger kind of chariot than the benna; and is thought to have derived its name from the British word *pet-war*, signifying *four*; this kind of carriage having four wheels. The carrus or currus was the common cart or waggon. This kind of chariot was used by the ancient Britons, in times of peace, for the purposes of agriculture and merchandise; and, in time of war, for carrying their baggage, and wives and children, who commonly followed the armies of all the Celtic nations. The covinus was a war-chariot, and a very terrible instrument of destruction; being armed with sharp scythes and hooks for cutting and tearing all who were so unhappy as to come within its reach. This kind of chariot was made very slight, and had few or no men in it besides the charioteer; being designed to drive with great force and rapidity, and to do execution chiefly with its hooks and scythes. The effedum and rheda were also war-chariots, probably of a large size, and stronger made than the covinus, designed for containing a charioteer for driving it, and one or two warriors for fighting. The far greatest number of the British war-chariots seem to have been of this kind. These chariots, as already observed, were to be found in great numbers among the Britons; inasmuch that Cæsar relates that Cassibelanus, after dismissing all his other forces, retained no fewer than 4000 of these war-chariots about his person. The same author relates, that, by continual experience, they had at last arrived at such perfection in the management of their chariots, that "in the most steep and difficult places they could stop their horses upon full stretch, turn them which way they pleased, run along the pole, rest on the harness, and throw themselves back into their chariots, with incredible dexterity."

CHARIOTS, in the heathen mythology, were sometimes consecrated to the sun; and the scripture observes, that Jothab burnt those which had been offered to the sun by the king's predecessors. This superstitious custom was an imitation of the heathens, and principally of the Persians, who had horses and chariots consecrated in honour of the sun. Herodotus, Xenophon, and Quintus Curtius, speak of white chariots crowned, which were consecrated to the sun, among the Persians, which in their ceremonies were drawn by white horses consecrated to the same luminary.

Triumphal CHARIOT, was one of the principal ornaments of the Roman celebration of a victory.

The Roman triumphal chariot was generally made of ivory, round like a tower, or rather of a cylindrical figure; it was sometimes gilt at the top, and ornamented with crowns; and, to represent a victory more naturally, they used to stain it with blood. It was usually drawn by four white horses; but oftentimes by lions, elephants, tigers, bears, leopards, dogs, &c.

CHARISIA, in the heathen theology, a wake, or night-festival, instituted in honour of the graces. It

continued the whole night, most of which time was spent in dancing; after which, cakes made of yellow flour mixed with honey, and other sweetmeats, were distributed among the assistants.—*Charisia* is also sometimes used to signify the sweetmeats used on such occasions.

CHARISIUS, in the heathen theology, a surname given to Jupiter. The word is derived from *χαρις*, *gratia*, "grace" or "favour;" he being the god by whose influence men obtain the favour and affection of one another. On which account the Greeks used at their meals to make a libation of a cup to Jupiter Charisius.

CHARISTA, a festival of the ancient Romans, celebrated in the month of February, wherein the relations by blood and marriage met, in order to preserve a good correspondence; and that, if there happened to be any difference among them, it might be the more easily accommodated, by the good-humour and mirth of the entertainment. *Ovid, Fasti*, i. 617.

CHARITY, among divines, one of the three grand theological virtues, consisting in the love of God and of our neighbour, or the habit and disposition of loving God with all our heart, and our neighbour as ourselves.

CHARITY is also used for the effect of a moral virtue, which consists in supplying the necessities of others, whether with money, counsel, assistance or the like.

CHARITY-Schools, are schools erected and maintained in various parishes by the voluntary contributions of the inhabitants, for teaching poor children to read, write, and other necessary parts of education. See SCHOOL.

CHARITY of *St Hippolitus*, a religious congregation founded about the end of the XIVth century, by one Bernardin Alvarez, a Mexican, in honour of *St Hippolitus* the martyr, patron of the city of Mexico; and approved by Pope Gregory XIII.

CHARITY of *our Lady*, in church-history, a religious order in France, which, though charity was the principal motive of their union, grew in length of time so disorderly and irregular, that their order dwindled, and at last became extinct.

There is still at Paris a religious order of women, called "Nuns hospitaliers of the charity of our lady." The religious of this hospital are by vow obliged to administer to the necessities of the poor and the sick, and those only women.

CHARLATAN, or CHARLETAN, signifies an empiric or quack, who retails his medicines on a public stage, and draws people about him with his buffooneries, feats of activity, &c. The word, according to Calpine, comes from the Italian *certano*; of *Cereto*, a town near Spoleto in Italy, where these impostors are said to have first risen. Menage derives it from *charlatano*, and that from *circulatorius*, of *circulator*, a quack.

CHARLEMAGNE, or Charles I. king of France by succession, and emperor of the west by conquest in 800, (which laid the foundation of the dynasty of the western Franks, who ruled the empire 472 years, till the time of Radolphus Aufpurgensis, the founder of the house of Austria). Charlemagne was as illustrious in the cabinet as in the field; and, though he could not write his name, was the patron of men of letters, the restorer of learning, and a wise legislator: he wanted only the virtue of humanity to render him the most accomplished

Charissus.
I
Charlemagne.

Charlemont
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Charles V.

accomplished of men; but when we read of his beheading 4500 Saxons, solely for their loyalty to their prince, in opposing his conquests, we cannot think he merits the extravagant encomiums bestowed on him by some historians. He died in 814, in the 74th year of his age, and 47th of his reign.

France had nine sovereigns of this name, of whom Charles V. merited the title of "the wife," (crowned in 1364, died in 1380): and Charles VIII. signalized himself in the field by rapid victories in Italy; crowned 1483, died in 1498. The rest do not deserve particular mention in this place. See (*History of*) FRANCE.

CHARLEMONT, a town of the province of Namur in the Austrian Netherlands, about 18 miles south of Namur. E. Long. 4. 40. N. Lat. 50. 10.

CHARLEMONT is also the name of a town of Ireland, situated on the river Blackwater, in the county of Armagh, and province of Ulster, about six miles south-east of Dungannon. W. Long. 6. 50. N. Lat. 50. 16.

CHARLEROY, a strong town in the province of Namur, in the Austrian Netherlands, situated on the river Sambre, about 19 miles west of Namur. E. Long. 4. 20. N. Lat. 50. 30.

CHARLES MARTEL, a renowned conqueror in the early annals of France. He deposed and restored Chilperic king of France; and had the entire government of the kingdom, once with the title of mayor of the palace, and afterwards as duke of France; but he would not accept the crown. He died, regretted, in 741.

CHARLES *le Gros*, emperor of the west in 881, king of Italy and Suabia, memorable for his reverse of fortune; being dethroned at a diet held near Mentz, by the French, the Italians, and the Germans, in 887: after which he was obliged to subsist on the bounty of the archbishop of Mentz. He died in 888.

CHARLES V. (emperor and king of Spain), was son of Philip I. archduke of Austria, and of Jane queen of Castile. He was born at Ghent, February 24. 1500; and succeeded to the crown of Spain in 1517. Two years afterwards he was chosen emperor at Francfort after the death of Maximilian his grandfather. He was a great warrior and politician: and his ambition was not satisfied with the many kingdoms and provinces he possessed; for he is supposed, with reason, to have aspired at universal empire. He is said to have fought 60 battles, in most of which he was victorious. He took the king of France (Francis I.) prisoner, and sold him his liberty on very hard terms: yet afterwards, when the people of Ghent revolted, he asked leave to pass through his dominions; and though the generous king thus had him in his power, and had an opportunity of revenging his ill-treatment, yet he received and attended him with all pomp and magnificence. He sacked Rome, and took the Pope prisoner; and the cruelties which his army exercised there are said to have exceeded those of the northern barbarians. Yet the pious emperor went into mourning on account of this conquest; forbade the ringing of bells; commanded processions to be made, and prayers to be offered up, for the deliverance of the Pope his prisoner; yet did not inflict the least punishment

on those who treated the holy father and the holy see with such inhumanity. He is acented by some Romish writers of favouring the Lutheran principles, which he might easily have extirpated. But the truth is, he found his account in the divisions which that sect occasioned; and he for ever made his advantage of them, sometimes against the Pope, sometimes against France, and at other times against the empire itself. He was a great traveller, and made 50 different journeys into Germany, Spain, Italy, Flanders, France, England, and Africa. Though he had been successful in many unjust enterprises, yet his last attempt on Metz, which he besieged with an army of 100,000 men, was very just and very unsuccessful.

Vecked at the reverse of fortune which seemed to attend his latter days, and oppressed by sickness, which unfitted him any longer from holding the reins of government with steadiness, or to guide them with address, he resigned his dominions to his brother Ferdinand and his son Philip; and retreated to the monastery of St. Justus near Placentia in Estremadura.

When Charles entered this retreat, he formed such a plan of life for himself as would have suited a private gentleman of moderate fortune. His table was neat, but plain; his domestics few; his intercourse with them familiar; all the cumbersome and ceremonious forms of attendance on his person were entirely abolished, as destructive of that social ease and tranquillity which he courted in order to sooth the remainder of his days. As the mildness of the climate, together with his deliverance from the burdens and cares of government, procured him at first a considerable remission from the acute pains of the gout, with which he had been long tormented, he enjoyed perhaps more complete satisfaction in this humble solitude than all his grandeur had ever yielded him. The ambitious thoughts and projects which had so long engrossed and disquieted him, were quite effaced from his mind. Far from taking any part in the political transactions of the princes of Europe, he restrained his curiosity even from an inquiry concerning them; and he seemed to view the busy scene which he had abandoned with all the contempt and indifference arising from his thorough experience of its vanity, as well as from the pleasing reflection of having disentangled himself from its cares.

Other amusements, and other objects, now occupied him. Sometimes he cultivated the plants in his garden with his own hands; sometimes he rode out to the neighbouring wood on a little horse, the only one that he kept, attended by a single servant on foot. When his infirmities confined him to his apartment, which often happened, and deprived him of these more active recreations, he either admitted a few gentlemen who resided near the monastery to visit him, and entertained them familiarly at his table; or he employed himself in studying mechanical principles, and in forming curious works of mechanism, of which he had always been remarkably fond, and to which his genius was peculiarly turned. With this view he had engaged Turriano, one of the most ingenious artists of that age, to accompany him in his retreat. He laboured together with him in framing models of the most useful machines, as well as in making experiments with regard

Charles V.

Charles. regard to their respective powers; and it was not seldom that the ideas of the monarch assisted or perfected the inventions of the artist. He relieved his mind at intervals with lighter and more fantastic works of mechanism, in fashioning puppets, which, by the structure of internal springs, mimicked the gestures and actions of men, to the no small astonishment of the ignorant monks, who, beholding movements which they could not comprehend, sometimes distrusted their own senses, and sometimes suspected Charles and Turriano of being in compact with invisible powers. He was particularly curious with regard to the construction of clocks and watches; and having found, after repeated trials, that he could not bring any two of them to go exactly alike, he reflected, it is said, with a mixture of surprise as well as regret on his own folly, in having bestowed so much time and labour in the more vain attempt of bringing mankind to a precise uniformity of sentiment concerning the intricate and mysterious doctrines of religion.

But in what manner sever Charles disposed of the rest of his time, he constantly reserved a considerable portion of it for religious exercises. He regularly attended divine service in the chapel of the monastery every morning and evening; he took great pleasure in reading books of devotion, particularly the works of St Augustine and St Bernard; and conversed much with his confessor, and the prior of the monastery, on pious subjects. Thus did Charles pass the first year of his retreat in a manner not unbecoming a man perfectly disengaged from the affairs of this present life, and standing on the confines of a future world, either in innocent amusements which soothed his pains, and relieved a mind worn out with excessive application to business; or in devout occupations, which he deemed necessary in preparing for another state.

But, about six months before his death, the gout, after a longer intermission than usual, returned with a proportional increase of violence. His shattered constitution had not strength enough remaining to withstand such a shock. It enfeebled his mind as much as his body; and from this period we hardly discern any traces of that sound and masculine understanding which distinguished Charles among his contemporaries. An illiberal and timid superstition depressed his spirit. He had no relish for amusements of any kind. He endeavoured to conform, in his manner of living, to all the rigour of monastic austerity. He desired no other society than that of monks, and was almost continually employed in chanting with them the hymns of the missal. As an expiation for his sins, he gave himself the discipline in secret with such severity, that the whip of cords which he employed as the instrument of his punishment, was found, after his decease, tinged with his blood. Nor was he satisfied with these acts of mortification, which, however severe, were not unexampled. The timorous and distrustful solicitude which always accompanies superstition, still continued to disquiet him, and depreciating all that he had done, prompted him to aim at something extraordinary, at some new and, singular act of piety that would display his zeal, and merit the favour of heaven. The act on which he fixed was as wild and

uncommon as any that superstition ever suggested to a disordered fancy. He resolved to celebrate his own obsequies before his death. He ordered his tomb to be erected in the chapel of the monastery. His domestics marched thither in funeral procession, with black tapers in their hands. He himself followed in his shroud. He was laid in his coffin with much solemnity. The service for the dead was chanted; and Charles joined in the prayers which were offered up for the rest of his soul, mingled his tears with those which his attendants shed, as if they had been celebrating a real funeral. The ceremony closed with sprinkling holy water on the coffin in the usual form, and, all the assistants retiring, the doors of the chapel were shut. Then Charles rose out of the coffin, and withdrew to his apartment, full of those awful sentiments which such a singular solemnity was calculated to inspire. But either the fatiguing length of the ceremony, or the impression which this image of death left on his mind, affected him so much, that next day he was seized with a fever. His feeble frame could not long resist its violence; and he expired on the 21st of September, after a life of 58 years, six months, and 21 days.

CHARLES I. } Kings of Britain. See BRITAIN,
CHARLES II. } n° 49,—254.

CHARLES XII. king of Sweden, was born in 1682. By his father's will, the administration was lodged in the hands of the queen-dowager Eleonora with five senators, till the young prince was 18: but he was declared major at 15, by the states convened at Stockholm. The beginning of his administration raised no favourable ideas of him, as he was thought both by Swedes and foreigners to be a person of mean capacity. But the difficulties that gathered round him, soon afforded him an opportunity to display his real character. Three powerful princes, Frederic king of Denmark, Augustus king of Poland and elector of Saxony, and Peter the Great czar of Muscovy, presuming on his youth, conspired his ruin almost at the same instant. Their measures alarming the council, they were for diverting the storm by negotiations; but Charles, with a grave resolution that astonished them, said, "I am resolved never to enter upon an unjust war, nor to put an end to a just one but by the destruction of my enemies. My resolution is fixed: I will attack the first who shall declare against me; and when I have conquered him, I may hope to strike a terror into the rest." The old counsellors received his orders with admiration; and were still more surprised when they saw him on a sudden renounce all the enjoyments of a court, reduce his table to the utmost frugality, dress like a common soldier, and, full of the ideas of Alexander and Cæsar, propose those two conquerors for his models in every thing but their vices. The king of Denmark began by ravaging the territories of the duke of Holstein. Upon this, Charles carried the war into the heart of Denmark; and made such a progress, that the king of Denmark thought it best to accept of peace, which was concluded in 1700. He next resolved to advance against the king of Poland, who had blocked up Riga. He had no sooner given orders for his troops to go into winter-quarters, than he received advice,

Charles.

that Narva, where count Horne was governor, was besieged by an army of 100,000 Muscovites. This made him alter his measures, and move toward the Czar; and at Narva he gained a surprising victory, which cost him not above 2000 men killed and wounded. The Muscovites were forced to retire from the provinces they had invaded. He pursued his conquests, till he penetrated as far as where the diet of Poland was sitting; when he made them declare the throne of Poland vacant, and elect Stanislaus their king: then making himself master of Saxony, he obliged Augustus himself to renounce the crown of Poland, and acknowledge Stanislaus by a letter of congratulation on his accession. All Europe was surprised with the expeditious finishing of this great negotiation, but more at the disinterestedness of the king of Sweden, who satisfied himself with the bare reputation of this victory, without demanding an inch of ground for enlarging his dominions. After thus reducing the king of Denmark to peace, placing a new king on the throne of Poland, having humbled the emperor of Germany, and protected the Lutheran religion, Charles prepared to penetrate into Muscovy in order to dethrone the Czar. He quickly obliged the Muscovites to abandon Poland, pursued them into their own country, and won several battles over them. The Czar, disposed to peace, ventured to make some proposals; Charles only answered, "I will treat with the Czar at Moscow." When this haughty answer was brought to Peter, he said, "My brother Charles still affects to act the Alexander, but I flatter myself he will not in me find a Darius." The event justified him: for the Muscovites, already beaten into discipline, and under a prince of such talents as Peter, entirely destroyed the Swedish army at the memorable battle of Pultowa, July 8. 1709; on which decisive day, Charles lost the fruits of nine years labour, and of almost 100 battles! The king, with a small troop, pursued by the Muscovites, passed the Boristhenes to Oczakow in the Turkish territories; and from thence, through desert countries, arrived at Bender; where the Sultan, when informed of his arrival, sent orders for accommodating him in the best manner, and appointed him a guard. Near Bender, Charles built a house, and intrenched himself; and had with him 1800 men, who were all clothed and fed, with their horses, at the expense of the Grand Signior. Here he formed a design of turning the Ottoman arms upon his enemies; and is said to have had a promise from the Vizir of being sent into Muscovy with 200,000 men. While he remained here, he insensibly acquired a taste for books: he read the tragedies of Corneille and Racine; with the works of Despreaux, whose satires he relished, but did not much admire his other works. When he read that passage in which the author represents Alexander as a fool and a madman, he tore out the leaf. He would sometimes play at chess: but when he recovered of his wounds, he renewed his fatigues in exercising his men; he tired three horses a day; and those who courted his favour were all day in their hoots. To dispose the Ottoman Porte to this war, he detached about 800 Poles and Cossacks of his retinue, with orders to pass the Neister, that runs by Bender, and

to observe what passed on the frontiers of Poland. The Muscovite troops, dispersed in those quarters, fell immediately upon this little company, and pursued them even to the territories of the Grand Signior. This was what the king expected. His ministers at the Porte excited the Turks to vengeance; but the Czar's money removed all difficulties, and Charles found himself in a manner prisoner among the Tartars. He imagined the sultan was ignorant of the intrigues of his Grand Vizir. Poniatofky undertook to make his complaints to the Grand Signior. The sultan, in answer, some days after, sent Charles five Arabian horses, one of which was covered with a saddle and housings of great riches; with an obliging letter, but conceived in such general terms, as gave reason to suspect that the minister had done nothing without the sultan's consent: Charles therefore refused them. Poniatofky had the courage to form a design of deposing the Grand Vizir; who accordingly was deprived of his dignity and wealth, and banished. The seal of the empire was given to Numan Cuproughly: who persuaded his master, that the law forbid him to invade the Czar, who had done him no injury; but to succour the king of Sweden as an unfortunate prince in his dominions. He sent his majesty 800 purjes, every one of which amounted to 500 crowns, and advised him to return peaceably to his own dominions. Charles rejected this advice, threatening to hang up the bashaws, and shave the beards of any janissaries who brought him such messages; and sent word that he should depend upon the Grand Signior's promise, and hoped to re-enter Poland as a conqueror with an army of Turks. After various intrigues at the Porte, an order was sent to attack this *head of iron*, as he was called, and to take him either alive or dead. He stood a siege in his house, with forty domestics, against the Turkish army; killed no less than 20 janissaries with his own hand; and performed prodigies of valour on a very unnecessary and unwarrantable occasion. But the house being set on fire, and himself wounded, he was at last taken prisoner, and sent to Adrianople; where the Grand Signior gave him audience, and promised to make good all the damages he had sustained. At last, after a stay of above five years, he left Turkey; and, having disguised himself, traversed Wallachia, Transylvania, Hungary, and Germany, attended only by one person; and in 16 days riding, during which time he never went to bed, came to Stralsund at midnight, November 21. 1714. His boots were cut from his swollen legs, and he was put to bed; where when he had slept some hours, the first thing he did was to review his troops, and examine the state of the fortifications. He sent out orders that very day, to renew the war with more vigour than ever. But affairs were now much changed: Augustus had recovered the throne of Poland; Sweden had lost many of its provinces; and was without money, trade, credit, or troops. The kings of Denmark and Prussia seized the island of Rugen; and besieged him in Stralsund, which surrendered; but Charles escaped to Carelskroon. When his country was threatened with invasion by so many princes, he, to the surprise of all Europe, marched into Norway with 20,000 men. A very few

Charles.

Charles's-
Cape
|
Charlock.

few Danes might have stopped the Swedish army ; but such a quick invasion they could not foresee. Europe was yet more at a loss to find the Czar so quiet, and not making a descent upon Sweden, as he had before agreed with his allies. This inaction was the consequence of one of the greatest designs, and at the same time the most difficult of any that were ever formed by the imagination of man. In short, a scheme was set on foot for a reconciliation with the Czar ; for replacing Stanislaus on the throne of Poland ; and setting James the second's son upon that of England, beside restoring the duke of Holstein to his dominions. Charles was pleased with these grand ideas, though without building much upon them, and gave his minister leave to act at large. In the mean time, Charles was going to make a second attempt upon Norway in 1718 ; and he flattered himself with being master of that kingdom in six months ; but he was killed at Frederickshall, a place of great strength and importance, which is reckoned to be the key of that kingdom, as he was examining the works.—This prince experienced the extremes of prosperity and of adversity, without being softened by the one, or disturbed for a moment at the other ; but was a man rather extraordinary than great, and fitter to be admired than imitated. He was honoured by the Turks for his rigid abstinence from wine, and his regularity in attending public devotion. In religion he was a Lutheran, and a strong believer in predestination. He wrote some observations on war, and on his own campaigns from 1700 to 1709 ; but the MS. was lost at the unfortunate battle of Pultowa.

CHARLES'S-CAPE, a promontory of Virginia, in North America, forming the northern head-land of the strait that enters the bay of Chesapeake.

CHARLES'S-FORT, a fortress in the county of Cork, and province of Munster, in Ireland, situated at the mouth of Kinfale harbour. W. Long. 8. 20. and N. Lat. 51. 21.

CHARLES'S-TOWN, or *Charleston*, the capital of South Carolina, in North America, situated on a peninsula formed by Ashley and Cooper rivers, the former of which is navigable for ships twenty miles above the town. W. Long. 79. 0. and N. Lat. 32. 30.

CHARLES'S-WAIN, in astronomy, seven stars in the constellation called *ursa major* or the Great Bear.

CHARLETON, an island at the bottom of Hudson's-bay, in North America, subject to Great Britain. W. Long. 80. 0. and N. Lat. 52. 30.

CHARLETON (Walter), a learned English physician born in 1619, was physician in ordinary to Charles I. and Charles II. one of the first members of the royal society, and president of the college of physicians. He wrote on various subjects ; but at last his narrow circumstances obliged him to retire to the island of Jersey, where he died in 1707.

CHARLOCK, the English name of the *RAPHANUS* ; it is a very troublesome weed among corn, being more frequent than almost any other. There are two principal kinds of it ; the one with a yellow flower, the other with a white. Some fields are particularly subject to be over-run with it, especially those which have been manured with cow-dung alone, that being a manure very favourable to the growth of it. The

farmers in some places are so sensible of this, that they always mix horse-dung with their cow-dung, when they use it for arable land. When barley, as is often the case, is infested with this weed to such a degree as to endanger the crop, it is a very good method to mow down the charlock in May, when it is in flower, cutting it so low as just to take off the tops of the leaves of barley with it ; by this means the barley will get up above the weed ; and people have got four quarters of grain from an acre of such land as would have scarce yielded any thing without this expedient. Where any land is particularly subject to this weed, the best method is to sow it with grafs-seed, and make a pasture of it ; for then the plant will not be troublesome, it never growing where there is a coat of grafs upon the ground.

Queen CHARLOTTE'S ISLAND, an island in the south sea, first discovered by captain Wallis in the Dolphin, in 1767, who took possession of it in the name of King George III. Here is good water, and plenty of cocoa-nuts, palm-nuts, and scurvy-grafs. The inhabitants are of a middle stature, and dark complexion, with long hair hanging over their shoulders ; the men are well made, and the women handsome ; their clothing is a kind of coarse cloth, or matting, which they fasten about their middle.

Queen CHARLOTTE'S ISLANDS, a cluster of south-sea islands discovered in 1767 by captain Carteret. He counted seven, and there were supposed to be many more. The inhabitants of these islands are described as extremely nimble and vigorous, and almost as well qualified to live in the water, as upon land : they are very warlike ; and, on a quarrel with some of captain Carteret's people, they attacked them with great resolution ; mortally wounded the master and three of the sailors ; were not at all intimidated by the firearms ; and at last, notwithstanding the aversion of captain Carteret to shed blood, he was obliged to secure the watering places by firing grape-shot into the woods which destroyed many of the inhabitants. These islands lie in S. Lat. 11°. E. Long. 164°. They are supposed to be the Santa Cruz of Mandana, who died there in 1595.

CHARM, a term derived from the Latin *carmen*, a " verse ;" and used to denote a magic power, or spell, by which, with the assistance of the devil, forcerers and witches were supposed to do wonderful things, far surpassing the power of nature.

CHARNEL, or **CHARNEL-HOUSE**, a kind of portico or gallery, usually in or near a church-yard, over which were anciently laid the bones of the dead, after the flesh was wholly consumed. Charnel-houses are now usually adjoining to the church.

CHARON, in fabulous history, the son of Erebus and Nox, whose office was to ferry the souls of the deceased over the waters of Acheron, for which each soul was to pay a piece of money. For this reason the Pagans had a custom of putting a piece of money into the mouth of the dead, in order that they might have something to pay Charon for their passage.

CHARONDAS, a celebrated legislator of the Thuriars, and a native of Catanea in Sicily, flourished 446 before Christ. He forbade any person's appearing armed in the public assemblies of the nation ; but one

Charlotte's
|
Charondas.

day going thither in haste, without thinking of his sword, he was no sooner made to observe his mistake than he ran it through his body.

CHAROST, a town of France, in Berry, with the title of a duchy. It is seated on the river Arnon, E. Long. 2. 15. N. Lat. 46. 56.

CHAROUX, a town of France, in the Bourbonnois, seated on an eminence, near the river Sioulle. It has two parishes, which are in different dioceses. E. Long. 3. 15. N. Lat. 46. 10.

CHARPENTIER (Francis) dean of the French academy, was born in 1620. His early capacity inclined his friends to educate him for the bar: but he was much more delighted with the study of languages and antiquity, than of the law; and preferred repose to tumult. M. Colbert made use of him in establishing his new academy of medals and inscriptions; and no person of that learned society contributed more than himself toward that noble series of medals which were struck on the considerable events, that distinguished the reign of Lewis XIV. He published several works, which were all well received; and died in 1702.

CHARR, in ichthyology. See **SALMO**.

CHARRON (Peter), the author of a book intitled *Of Wisdom*, which gained him great reputation, was born at Paris in the year 1541. After being advocate in the parliament of Paris for five or six years, he applied himself to divinity; and became to great a preacher, that the bishops of several dioceses offered him the highest dignities in their gift. He died at Paris, suddenly in the street, November 16, 1603.

CHART, or **SEA-CHART**, an hydrographical map, or a projection of some part of the earth's superficies *in plano*, for the use of navigators.

Charts differ very considerably from geographical or land maps, which are of no use in navigation. Nor are sea-charts all of the same kind, some being what we call plane-charts, others mercator-charts, and others globular charts.

Plane CHART, is a representation of some part of the superficies of the terraqueous globe, in which the meridians are supposed parallel to each other, the parallels of latitude at equal distances, and consequently the degrees of latitude and longitude every where equal to each other. See **PLANE CHART**.

Mercator's CHART, is that where the meridians are straight lines, parallel to each other, and equidistant; the parallels are also straight lines, and parallel to each other: but the distance between them increases from the equinoctial towards either pole, in the ratio of the secant of the latitude to the radius. See **NAVIGATION**, Sect. iv.

Globular CHART, a meridional projection, wherein the distance of the eye from the plane of the meridian, upon which the projection is made, is supposed to be equal to the sine of the angle 45°. This projection comes the nearest of all to the nature of the globe, because the meridians therein are placed at equal distances; the parallels also are nearly equidistant, and consequently the several parts of the earth have their proper proportion of magnitude, distance, and situation, nearly the same as on the globe itself. See **GLOBULAR Projection**.

Chorographic CHARTS, descriptions of particular countries. See **CHOROGRAPHY**.

Heliographic CHART, descriptions of the body of the sun, and of the maculae or spots observed in it. See **ASTRONOMY**, n° 14,—18. and 33,—39. and 2^d Plate XLII. fig. 1.

Hydrographic CHARTS, sheets of large paper, whereon several parts of the land and sea are described, with their respective coasts, harbours, sounds, flats, rocks, shelves, sands, &c. together with the longitude and latitude of each place, and the points of the compass. See **MERCATOR's CHART**.

Selenographic CHARTS, particular descriptions of the spots, appearances, and maculae of the moon. See **ASTRONOMY**, n° 19. and 40,—43. and 3^d Plate XLII.

Topographic CHARTS, draughts of some small parts of the earth only, or of some particular places, without regard to its relative situation, as London, York, &c.

CHARTA, or **CARTA**, primarily signifies a sort of paper made of the plant *papyrus* or *biblus*. See **PAPER**, and **CHARTER**.

CHARTA Emporetica, in pharmacy, &c. a kind of paper made very soft and porous, used to filter withal. See **FILTRATION**, &c.

CHARTA is also used in our ancient customs for a charter, or deed in writing. See **CHARTER**.

CHARTA Magna, the great charter, is an ancient instrument, containing several privileges and liberties granted to the church and state by Edward the confessor; together with others relating to the feudal laws of William the conqueror, granted by Henry I.; all confirmed by the succeeding princes above thirty times. See **LAW**, n° 31. par. penult.

CHARTER, in law, a written instrument, or evidence of things acted between one person and another. The word charter comes from the Latin *carta*, anciently used for a public and authentic act, a donation, contract, or the like; from the Greek *χαρτα*, "thick paper" or "pasteboard," whereon public acts were wont to be written. Britton divides charters into those of the king, and those of private persons. 1. Charters of the king, are those whereby the king passeth any grant to any person or body politic, as a *charter of exemption of privilege*, &c.; *charter of pardon*, whereby a man is forgiven a felony, or other offence committed against the king's crown and dignity; *charter of the forest*, wherein the laws of the forest are comprised, such as the charter of Canutus, &c. 2. Charters of private persons, are deeds and instruments for the conveyance of lands, &c. And the purchaser of lands shall have all the charters, deeds, and evidences, as incident to the time, and for the maintenance of his title.

CHARTER-Governments in America. See **COMMONS**.

CHARTER-Land, such land as a person holds by charter; that is, by evidence in writing, otherwise called freehold.

CHARTERPARTY, in commerce, denotes the instrument of freightage, or articles of agreement for the hire of a vessel. See **FREIGHT**, &c.

The *charterparty* is to be in writing; and to be signed both by the proprietor or the master of the ship, and the merchant who freights it. It is to contain the name and the burden of the vessel; those of the master and the freighter; the price or rate of freight; and

Chartophylax *lax* *l* *Charybdis*. the time of loading and unloading; and the other conditions agreed on. It is properly a deed, or policy, whereby the master or proprietor of the vessel engages to furnish immediately a tight sound vessel, well equipped, caulked, and stopp'd, provided with anchors, sails, cordage, and all other furniture to make the voyage required, as equipage, hands, victuals, and other munitions; in consideration of a certain sum to be paid by the merchant for the freight. Lastly, the ship with all its furniture, and the cargo, are respectively subjected to the conditions of the *charterparty*. The *charterparty* differs from a *bill of lading*, in that the first is for the entire freight, or lading, and that both for going and returning; whereas the latter is only for a part of the freight, or at most only for the voyage one way.

The president Boyer says, the word comes from hence, that *per medium charta incidebatur, et sic fiebat charta partita*; because, in the time when notaries were less common, there was only one instrument made for both parties: this they cut in two, and gave each his portion; and joined them together at their return, to know if each had done his part. This he observes to have been practised in his time; agreeable to the method of the Romans, who, in their stipulations, used to break a staff, each party retaining a moiety thereof as a mark.

CHARTOPHYLAX, the name of an officer of the church of Constantinople, who attends at the door of the rails when the sacrament is administered, and gives notice to the priests to come to the holy table. He represents the patriarch upon the bench, tries all ecclesiastical causes, keeps all the marriage registers, assists at the consecration of bishops, and presents the bishop elect at the solemnity, and likewise all other subordinate clergy. This office resembles in some shape that of the *bibliothecarius* at Rome.

CHARTRES, a large city of France, in the province of Orleans, situated on the river Eure, in E. Long. 1. 32. N. Lat. 48. 47. It is a bishop's see.

CHARTREUSE, or **CHARTREUSE-GRAND**, a celebrated monastery, the capital of all the convents of the Carthusian monks, situated on a steep rock in the middle of a large forest of fir-trees, about seven miles north-east of Grenoble, in the province of Dauphine in France: E. Long. 5. 5. N. Lat. 45. 20. See **CARTHUSIANS**.

From this mother-convent, all the others of the same order take their name; among which was the Chartreuse of London, corruptly called the charterhouse, now converted into an hospital, and endowed with a revenue of 600 l. *per ann.*

Here are maintained 80 decayed gentlemen, not under 50 years of age: also 40 boys are educated and fitted either for the university or trades. Those sent to the university, have an exhibition of 20 l. a-year for eight years; and have an immediate title to nine church-livings in the gift of the governors of the hospital, who are sixteen in number, all persons of the first distinction, and take their turns in the nomination of pensioners and scholars.

CHARYBDIS, a celebrated whirlpool in the straits of Messina between Italy and Sicily; much taken notice of by the ancient historians and poets, and de-

scribed by them in terms of the greatest horror. It is still dangerous, but not so formidable as in former ages; Mr Brydone only says, that "it often occasions such an intestine and irregular motion in the water, that the helm loses most of its power, and ships have the greatest difficulty to get into the harbour of Messina, even with the fairest wind that can blow." He conjectures that it is formed by the calciform promontory of the island of Sicily, which makes part of the harbour above mentioned, along with some other causes unknown.

CHARTULARY, **CHARTULARIUS**, a title given to an ancient officer in the Latin church, who had the care of charters and papers relating to public affairs. The chartulary presided in ecclesiastical judgments, in lieu of the pope. In the Greek church the chartulary was called *chartophylax*; but his office was there much more considerable; and some even distinguish the chartulary from the *chartophylax* in the Greek church. See **CHARTOPHYLAX**.

CHASE, or **CHACE**, in law, is used for a driving of cattle to or from any place; as to a distress, or forelet, &c.

CHASE, or **Chace**, is also a place of retreat for deer and wild beasts; of a middle kind between a forest and a park, being usually less than a forest, and not possessed of so many privileges; but wanting, *v. g.* courts of attachment, *swainmote*, and *justice-seat*. *See *Forest*. Yet it is of a large extent, and stocked both with a greater diversity of wild beasts or game, and more keeper than a park. Crompton observes, that a forest cannot be in the hands of a subject but it forthwith loses its name, and becomes a *chafe*; in regard all those courts lose their nature when they come into the hands of a subject; and that none but a king can make a lord chief justice in eyre of the forest. See **JUSTICE in Eyre**.

The following history of the English chases is given by Mr Pennant: "At first the beasts of chafe had this whole island for their range; they knew no other limits than the ocean, nor confessed any particular master. When the Saxons had established themselves in the heptarchy, they were reserved by each sovereign for his own particular diversion: hunting and war, in those uncivilized ages, were the only employ of the great; their active, but uncultivated minds, being susceptible of no pleasures but those of a violent kind, such as gave exercise to their bodies, and prevented the pain of thinking.

"But as the Saxon kings only appropriated those lands to the use of forests which were unoccupied, so no individuals received any injury: but when the conquest had settled the Norman line on the throne, this passion for the chase was carried to an excess, which involved every civil right in a general ruin: it superseded the consideration of religion even in the superstitious age: the village-communities, nay even the most sacred edifices, were turned into one vast waste, to make room for animals, the objects of a lawless tyrant's pleasure. The new forest in Hampshire is too true an instance to be dwelt on; sanguinary laws were enacted to preserve the game; and in the reigns of William Rufus, and Henry I. it was less criminal to destroy one of the human species than a beast of chafe. Thus it continued while the Norman line filled

Chartulary
l *Chafe*.

+ *Brit. Zool. i. 42.*

Chafe.

led the throne; but when the Saxon line was restored under Henry II. the rigour of the forest laws was immediately softened.

"When our barons began to form a power, they claimed a vault, but more limited tract for a diversion that the English were always fond of. They were very jealous of any encroachments on their respective bounds, which were often the cause of deadly feuds; such a one gave cause to the fatal day of *Chewy-chace*; a fact which, though recorded only in a ballad, may, from what we know of the manners of the times, be founded on truth: not that it was attended with all the circumstances which the author of that natural but heroic composition hath given it; for, on that day, neither a *Percy*, nor a *Douglas* fell: here the poet seems to have claimed his privilege, and mixed with this fray some of the events of the battle of *Otterbourne*.

"When property became happily more divided by the relaxation of the feudal tenures, these extensive hunting-grounds became more limited; and as tillage and husbandry increased, the beasts of chase were obliged to give way to others more useful to the community. The vast tracts of land, before dedicated to hunting, were then contracted; and, in proportion as the useful arts gained ground, either lost their original destination, or gave rise to the invention of parks. Liberty and the arts seem coeval; for when once the latter got footing, the former protected the labours of the industrious from being ruined by the licentious sportsman, or being devoured by the objects of his diversion: for this reason, the subjects of a despotic government still experience the inconveniences of vast wastes, and forests, the terrors of the neighbouring husbandmen; while in our well regulated monarchy very few chases remain. The English still indulge themselves in the pleasures of hunting; but confine the deer-kind to parks, of which England boasts of more than any other kingdom in Europe. The laws allow every man his pleasure; but confine them in such bounds as prevents them from being injurious to the meanness of the community. Before the Reformation, the prelates seem to have guarded sufficiently against this want of amusement, the see of Norwich, in particular, being possessed, about that time, of thirteen parks.

CHASE, in the sea-language, is to pursue a ship; which is also called *giving chase*.

Stern Chase, is when the chaser follows the chased astern directly upon the same point of the compass.

To lie with a Ship's fore-foot in a Chase, is to fall and meet with her by the nearest distance; and so to cross her in her way, or to come across her fore-foot.

A ship is said to have a *good chase*, when she is so built forward on, or a-stern, that she can carry many guns to shoot forwards or backwards; according to which she is said to have a *good forward*, or *good stern*, *chase*.

CHASE-Guns, are such whose ports are either in the head (and then they are used in chasing of others); or in the stern, which are only useful when they are pursued or chased by any other ship.

CHASE of a Gun, is the whole bore or length of a piece taken within-side.

Chafe

Chateau.

Wild-geese Chase, a term used to express a sort of racing on horseback used formerly, which resembled the flying of wild-geese; those birds generally going in a train one after another, not in confused flocks as other birds do. In this sort of race the two horses, after running twelve score yards, had liberty, which horse soever could take the leading, to ride what ground the jockey pleased, the hindmost horse being bound to follow him within a certain distance agreed on by the articles, or else to be whipped in by the tryers and judges who rode by; and whichever horse could distance the other, won the race. This sort of racing was not long in common use; for it was found inhuman, and destructive to good horses, when two such were matched together. For in this case neither was able to distance the other till they were both ready to sink under their riders; and often two very good horses were both spoiled, and the wagers forced to be drawn at last. The mischief of this sort of racing soon brought in the method now in use, of running only for a certain quantity of ground, and determining the plate or wager by the coming in first at the post.

CHASING of Gold, Silver, &c. See ENCHASING.

CHASTE-TREE. See VITEX.

CHASTITY; purity of the body, or freedom from obscenity.—The Roman law justifies homicide in defence of the chastity, either of one's self or relations; and so also, according to Selden, stood the law in the Jewish republic. Our law likewise justifies a woman for killing a man who attempts to ravish her. So the husband or father may justify killing a man who attempts a rape upon his wife or daughter; but not if he takes them in adultery by consent: for the one is forcible and felonious, but not the other. And without doubt the forcibly attempting a crime of a still more detestable nature, may be equally resisted by the death of the unnatural aggressor. For the one uniform principle that runs through our own and all other laws seems to be this, that where a crime in itself capital is endeavoured to be committed by force, it is lawful to repel that force by the death of the party attempting.

CHATEAU-BRIANT, a town of France in Brittany, with an old castle. W. Long. 1. 20. N. Lat. 47. 40.

CHATEAU-Chinon, a town of France in Nivernois, and capital of Morvant, with a considerable manufacture of cloth. E. Long. 3. 48. N. Lat. 47. 2.

CHATEAU-Dauphin, a very strong castle of Piedmont in Italy, and in the marquise of Saluces, belonging to the king of Sardinia. It was taken by the combined army of France and Spain in 1744, and was restored by the treaty of Aix-la-Chapelle.

CHATEAU-du-Loir, a town of France in the Maine, famous for sustaining a siege of seven years against the Count of Mans. It is seated on the river Loir, in E. Long. 0. 25. N. Lat. 47. 40.

CHATEAU-Dun, an ancient town of France, and capital of the Dunois, with a castle and rich monastery; seated on an eminence near the river Loir, in E. Long. 1. 26. N. Lat. 48. 4.

CHATEAU-Nenf, the name of several towns of France, viz. one in Perche; another in Angoumois, on the river Charente, near Angoulême; a third in Berry, seated

Chateau seated on the river Cher; and several other small places.
CHATEAU-Portien, a town of France, in Champagne, and in a district called Portien, with a castle built on a rock, near the river Aine. E. Long. 4. 23. N. Lat. 49. 35.

CHATEAU-Renaud, a town of France in the Gate-nois, where clothes are made for the army, and where there is a trade in saffron. E. Long. 2. 25. N. Lat. 48. 0. This is also the name of a town of Touraine, in France, with the title of a marquise. E. Long. 2. 41. N. Lat. 47. 22.

CHATEAU-Roux, a town of France, in Berry, with the title of a duchy. It has a cloth-manufacture, and is seated in a very large pleasant plain on the river Indre, in E. Long. 1. 47. N. Lat. 46. 49.

CHATEAU-Thierry, a town of France, in Champagne, with the title of a duchy, and a handsome castle on an eminence, seated on the river Maine, in E. Long. 3. 23. N. Lat. 49. 12.

CHATEAU-Vilain, a town of France, in Champagne, with a castle, and the title of a duchy; seated on the river Aujon. E. Long. 2. 59. N. Lat. 48. 0.

CHATEL, or **CHATE**, a town of Lorraine, in the Vosges, seated on the river Moselle, eight miles from Mirecourt.

CHATEL-Aillon, a maritime town of France, in Saintonge, five miles from Rochelle; formerly very considerable, but is now greatly decayed.

CHATEL-Chalon, a town of France, in Franche Comté, remarkable for its abbey of benedictine nuns. E. Long. 5. 25. N. Lat. 46. 50.

CHATELET, a town of the Netherlands, in Namur, seated on the Sambre, in the bishoprick of Liege. E. Long. 4. 28. N. Lat. 50. 25.

CHATELET, the name of certain courts of justice established in several cities in France. The grand chatelet at Paris, is the place where the presidial or ordinary court of justice of the provost of Paris is kept; consisting of a presidial, a civil chamber, a criminal chamber, and a chamber of policy. The little chatelet is an old fort, now serving as a prison.

CHATELLERAULT, a town of France, in Poitou, with the title of a duchy; seated in a fertile and pleasant country, on the river Vienne, over which there is a handsome stone-bridge. E. Long. 0. 40. N. Lat. 46. 34.

CHATHAM, a town of Kent, adjoining to Rochester, and seated on the river Medway. It is the principal station of the royal navy; and the yards and magazines are furnished with all sorts of naval stores, as well as materials for building and rigging the largest men of war. The entrance into the river Medway is defended by Sheerness and other forts; and, in the year 1757, by direction of the duke of Cumberland, several additional fortifications were begun at Chatham; so that now the ships are in no danger of an insult, either by land or water. It has a church; a chapel of ease; and a ship used as a church for the sailors: it has likewise about 500 houses, mostly low, and built with brick; the streets are narrow, and paved; and it contains about 3000 inhabitants. The principal employment of the labouring hands is ship-building in the king's yard, and private docks. E. Long. 0. 40. N. Lat. 51. 20.

CHATIGAN, a town of Asia, in the kingdom of Bengal, on the most easterly branch of the river Ganges. It is but a poor place, though it was the first the Portuguese settled at in these parts, and who still keep a sort of possession. It has but a few cotton manufactures; but affords the best timber for building of any place about it. The inhabitants are so suspicious of each other, that they always go armed with a sword, pistol, and blunderbuss, not excepting the priests. It is subject to the Great Mogul. E. Long. 91. 10. N. Lat. 23. 0.

CHATILLON-SUR-SEINE, a town of France, in Burgundy, divided into two by the river Seine. It is 32 miles from Langres, and 40 from Dijon; and has iron-works in its neighbourhood. E. Long. 4. 33. N. Lat. 47. 45.

CHATRE, a town of France, in Berry, seated on the river Indres, 37 miles from Bourges. It carries on a considerable trade in cattle. E. Long. 1. 55. N. Lat. 46. 35.

CHATELS, a Norman term, under which were anciently comprehended all moveable goods; those immoveable being termed *fiefs*, or *fee*.

CHATELS, in the modern sense of the word, are all sorts of goods, moveable or immoveable, except such as are in the nature of freehold.

CHATTERER, in ornithology. See **AMPELIS**.

CHAUCER (Sir Geoffrey), an eminent English poet in the 14th century, born at London in 1328. After he left the university he travelled into Holland, France, and other countries. Upon his return he entered himself in the Inner-temple, where he studied the municipal laws of England. His first station at court was page to Edward III. and he had a pension granted him by that prince till he could otherwise provide for him. Soon after we find him gentleman of the king's privy chamber; next year, shield-bearer to the king. Esteemed and honoured, he spent his younger days in a constant attendance at court, or for the most part living near it, in a square stone house near the Park-gate at Woodstock, still called Chaucer's house.

Soon after, having got the duke of Lancaster for his patron, Chaucer began every day to rise in greatness. In 1373 he was sent, with other persons, to the republic of Genoa to hire ships for the king's navy (our want of shipping in those times being usually supplied by such means); and the king was so well satisfied with his negotiation, that, on his return, he obtained a grant of a pitcher of wine daily in the port of London, to be delivered by the butler of England; and soon after was made comptroller of the customs for wool, wool-fells, and hides; an office which he discharged with great diligence and integrity. At this period, Chaucer's income was about L. 1000 a year; a sum which in those days might well enable him to live, as he says he did, with dignity in office, and hospitality among his friends. It was in this meridian blaze of prosperity, in perfect health of body and peace of mind, that he wrote his most humorous poems. His satires against the priests were probably written to oblige his patron the duke of Lancaster, who favoured the cause of Wickliff, and endeavoured to expose the clergy to the indignation of the people. In the last year of Edward III. our poet was employed in

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Chaucer.

in a commission to treat with the French; and in the beginning of king Richard's reign, he was in some degree of favour at court.

The duke of Lancaster at last finding his views checked, began to abandon Wickliffe's party: upon which, Chaucer likewise, how much soever he had espoused that divine's opinions, thought it prudent to conceal them more than he had done. With the duke's interest that of Chaucer entirely sunk; and the former passing over sea, his friends felt all the malice of the opposite party. These misfortunes occasioned his writing that excellent treatise *The Testament of Love*, in imitation of Boethius on the consolation of philosophy. Being much reduced, he retired to Woodstock, to comfort himself with study, which produced his admirable treatise of the *Affrolabe*.

The duke of Lancaster at last surmounting his troubles, married lady Catharine Swynford, sister to Chaucer's wife; so that Thomas Chaucer, our poet's son, became allied to most of the nobility, and to several of the kings of England. Now the fun began to shine upon Chaucer with an evening ray; for by the influence of the duke's marriage, he again grew to a considerable share of wealth. But being now 70, he retired to Dunnington-castle near Newbury. He had not enjoyed this retirement long before Henry IV. son of the duke of Lancaster, assumed the crown, and in the first year of his reign gave our poet marks of his favour. But however pleasing the change of affairs might be to him at first, he afterwards found no small inconveniences from it. The measures and grants of the late king were annulled; and Chaucer, in order to procure fresh grants of his pensions, left his retirement, and applied to court: where, though he gained a confirmation of some grants, yet the fatigue of attendance, and his great age, prevented him from enjoying them. He fell sick at London; and ended his days in the 72d year of his age, leaving the world as though he despised it, as appears from his song of *Flie from the Fesle*. The year before his death he had the happiness, if at his time of life it might be so called, to see the son of his brother-in-law (Hen. IV.) seated on the throne. He was interred in Westminster abbey; and in 1556, Mr Nicholas Bingham, a gentleman of Oxford, at his own charge, erected a handsome monument for him there. Caxton first printed the Canterbury tales; but his works were first collected, and published in one volume folio, by William Thynne, London, 1542. They were afterwards reprinted in 1561, 1598, 1602. Oxford, 1721.

Chaucer was not only the first, but one of the best poets which these kingdoms ever produced. He was equally great in every species of poetry which he attempted; and his poems in general possess every kind of excellence, even to a modern reader, except melody and accuracy of measure; defects which are to be attributed to the imperfect state of our language, and the infancy of the art in this kingdom at the time when he wrote. "As he is the father of English poetry, (says Mr Dryden,) so I hold him in the same degree of veneration as the Grecians held Homer, or the Romans Virgil; he is a perpetual fountain of good sense, learned in all sciences, and therefore speaks properly on all subjects: as he knew what to say, so he knows also when

to leave off; a continence which is practised by few writers; and scarcely by any of the ancients, except Virgil and Horace." This character Chaucer certainly deserved. He had read a great deal; and was a man of the world, and of sound judgement. He was the first English poet who wrote *poetically*, as Dr Johnson observes in the preface to his dictionary, and (he might have added) who wrote like a gentleman. He had also the merit of improving our language considerably, by the introduction and naturalization of words from the *Provençal*, at that time the most polished dialect in Europe.

CHAUD-MEDLEY, in law, is of much the same import with CHANCE-Medley. The former in its etymology signifies an affray in the heat of blood or passion; the latter, a casual affray. The latter is in common speech too often erroneously applied to any manner of homicide by misadventure; whereas it appears by the stat. 24 Hen. VIII. c. 5. and ancient books (Staundf. P. C. 16.) that it is properly applied to such killing as happens in self-defence, upon sudden encounter.

CHAUL, a town of the East Indies, on the coast of Malabar, in the province of Bagan, and kingdom of Vilapour. Its river affords a good harbour for small vessels. The town is fortified, and so is the island on the south side of the harbour. It had formerly a good trade, but is now miserably poor. It was taken by the Portuguese in 1507, to whom it still belongs. It is fifteen miles south of Bombay, and five miles from the sea. E. Long. 72. 45. N. Lat. 18. 30.

CHAULIEU (William Amfisey de), abbé d'Amale, one of the most polite and ingenious of the French poets, was born in 1629; and died at the age of 84. The most complete edition of his poems is that printed in 2 vols 8vo, in 1733.

CHAUMONT, a town of France, in Champagne, and in the district of Bassigny, of which it is the capital. It is seated on a mountain near the river Marne. E. Long. 5. 15. N. Lat. 48. 6.

CHAUNE, a town of France, in Picardy, and in the district of Santerre, with the title of a duchy. E. Long. 2. 55. N. Lat. 49. 45.

CHAUNY, a town of France, in Picardy, seated on the river Oise, in Chantry. E. Long. 3. 17. N. Lat. 49. 37.

CHAUVIN (Stephen), a celebrated minister of the reformed religion, born at Nismes, left France at the revocation of the edict of Nantz, and retired to Rotterdam, where he began a new *Journal des Savans*; and afterwards removing to Berlin, continued it there three years. At this last place, he was made professor of philosophy, and discharged that office with much honour and reputation. His principal work is a philosophical dictionary, in Latin, which he published at Rotterdam in 1692: and gave a new edition of it much augmented, at Lewarden, in 1713, folio. He died in 1725, aged 85.

CHAVEZ, a strong town of Tralos-Montes in Portugal, is seated at the foot of a mountain on the river Tamega. It has two suburbs, and as many forts; one of which looks like a citadel. Between the town and suburb of Magdalena, is an old Roman stone-bridge above 92 geometrical paces long. W. Long. 7. 1. N. Lat. 41. 45.

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CHAZINZARIANS, a sect of heretics, who rose in Armenia in the seventh century. The word is formed of the Armenian, *chazur*, "cross." They are also called *staurolatæ*, which, in Greek, signifies the same as *chazinarians* in Armenian, *viz.* *adversers of the cross*; they being charged with paying adoration to the cross alone. In other respects they were Nestorians; and admitted two persons in Jesus Christ. Nicephorus ascribes other singularities to them; particularly their holding an annual feast, in memory of the dog of their false prophet Sergius which they called *artizbartzes*.

CHAZELLES (John Matthew), a celebrated French mathematician and engineer, was born at Lyons in 1657. M. du Hamel, with whom he got acquainted, finding his genius incline towards astronomy, presented him to M. Cassini, who employed him in his observatory. In 1684, the duke of Mortemar made use of Chazelles, to teach him mathematics; and, the year after, procured him the preferment of hydrography professor for the galleys of Marleilles, where he set up a school for young pilots designed to serve aboard the galleys. In 1686, the galleys made four little campaigns, or rather four courses, purely for exercise. Chazelles went on board every time with them; kept his school upon the sea, and shewed the practice of what he taught. In the years 1687 and 1688, he made two other sea-campaigns, in which he drew a great many plans of ports, roads, towns, and forts, which were lodged with the ministers of state. At the beginning of the war, which ended with the peace of Ryfwick, some marine officers, and Chazelles among the rest, fancied the galleys might be so contrived as to live upon the ocean; that they might serve to tow the men of war when the wind failed or proved contrary, and also help to secure the coast of France upon the ocean. Chazelles was sent to the west coasts in July 1689, to examine the practicableness of this scheme; and in 1690, fifteen galleys new built set sail from Rochefort, and cruised as far as Torbay in England, and proved serviceable at the descent upon Tinmouth. After this, he digested into order, the observations he had made on the coasts of the ocean; and drew distinct maps with a portulan to them, *viz.* a large description of every haven, of the depth, the tides, the dangers and advantages discovered, &c. These maps were inserted in the *Neptune Francoise*, published in 1692, in which year Chazelles was engineer at the descent at Oneille. In 1693, Monsieur de Pontchartrain, then secretary of state for the marine, and afterwards chancellor of France, resolved to get the *Neptune Francoise* carried on to a second volume, which was also to take in the Mediterranean. Chazelles desired that he might have a year's voyage on this sea, for making astronomical observations; and, the request being granted, he passed by Greece, Egypt, and the other parts of Turkey, with his quadrant and telescope in his hand. When he was in Egypt he measured the pyramids; and finding the sides of the largest precisely facing the four cardinal points, naturally concluded this position to have been intended, and also that the poles of the earth and meridians had not since deviated. Chazelles likewise made a report of his voyage in the Levant, and

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gave the academy all the satisfaction they wanted concerning the position of Alexandria: upon which he was made a member of the academy in 1695. He died in 1710.

CHEASAPEAKE BAY, in North America, the entrance between Cape Henry and Cape Charles, running up 30 miles between Virginia and Maryland. It is navigable almost all the way for large ships, and has several navigable rivers that fall into it, by means of which, ships go up to the very doors of the planters, to take in their lading of goods.

CHEATS, are deceitful practices in defrauding, or endeavouring to defraud, another of his known right, by means of some artful device, contrary to the plain rules of common honesty; as by playing with false dice, or by causing an illiterate person to execute a deed to his prejudice, by reading it over to him in words different from those in which it was written, &c.—If any person deceitfully get into his hands or possession, any money or other things of any other person's by colour of any false token, &c. being convicted, he shall have such punishment by imprisonment, setting upon the pillory, or by any corporeal pain except pains of death, as shall be adjudged by the persons before whom he shall be convicted.—As there are frauds which may be relieved civilly, and not punished criminally; so there are other frauds, which in a special case may not be helped civilly, and yet shall be punished criminally. Thus if a minor goes about the town, and pretending to be of age, defrauds many persons by taking credit for a considerable quantity of goods, and then insisting on his nonage, the persons injured cannot recover the value of their goods, but they may indict and punish him for a common cheat. Persons convicted of obtaining money or goods by false pretences, or of sending threatening letters in order to extort money or goods, may be punished with fine or imprisonment, or by pillory, whipping, or transportation.

CHEBRECHIN, a town of Poland, in the province of Russia and palatinate of Belkrow. It is seated on the declivity of a hill, and the river Wierpi waters its walls, and afterwards falls into the river Bog. The Jews there are very rich. E. Long. 23. 51. N. Lat. 50. 35.

CHECAYA, in Turkish affairs, the second officer of the Janizaries, who commands them under the aga, and is otherwise called *protogero*.

There is also a *checaya* of the treasury, stables, kitchen, &c. the word signifying as much as lieutenant, or the second in any office.

CHECK, or **CHECK-ROLL**, a roll or book, wherein are contained the names of such persons as are attendants and in the pay of the king, or other great personages, as their household servants.

Clerk of the CHECK, in the king's household, has the check and controulment of the yeomen of the guard, and all the uihers belonging to the royal family, allowing their absence or defects in attendance, or diminishing their wages for the same, &c. He also, by himself or deputy, takes the view of those that are to watch in the court, and has the setting of the watch, &c.

Clerk of the CHECK in the royal dock-yards, an officer who keeps a muster or register of all the men

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employed aboard his majesty's ships and vessels, and also of all the artificers and others in the service of the navy at the port where he is settled.

CHECK, in falconry, a term used of a hawk, when the forlakes her proper game, to fly at pyes, crows, rooks, or the like, that crows her in her flight.

CHECKY, in heraldry, is when the shield, or a bordure, &c. is chequered, or divided into chequers or squares, in the manner of a chess-board.

This is one of the most noble and most ancient figures used in armoury; and a certain author saith, that it ought to be given to none but great warriors, in token of their bravery; for the chess-board represents a field of battle; and the pawns placed on both sides represent the soldiers of the two armies, which move, attack, advance, or retire, according to the will of the gamesters who are the generals.

This figure is always composed of metal and colour. But some authors would have it reckoned among the several sorts of furs.

CHEEK, in anatomy, that part of the face situated below the eyes on each side.

CHEEKS, a general name among mechanics, for almost all those pieces of their machines and instruments, that are double, and perfectly alike. Thus,

The *Cheeks of a Printing-press*, are its two principal pieces: they are placed perpendicular, and parallel to each other; serving to sustain the three sommers, *viz.* the head, shelves, and winter, which bear the spindle, and other parts of the machine. See **PRINTING-Press**.

CHEESE, a sort of food prepared of curdled milk purged from the serum or whey, and afterwards dried for use.

Cheese differs in quality according as it is made from new or skimmed milk, from the curd which separates spontaneously upon standing, or that which is more speedily produced by the addition of rennet. Cream also affords a kind of cheese, but quite fat and butyraceous, and which does not keep long. Analyzed chemically, cheese appears to partake much more of an animal nature than butter, or the milk from which it was made. It is infusible in every liquid except spirit of nitre, and caustic alkaline ley. Shaved thin, and properly treated with hot water, it forms a very strong cement if mixed with quicklime*. When prepared with the hot water, it is recommended in the Swedish memoirs to be used by anglers as a bait. It may be made into any form, is not softened by the cold water, and the fishes are fond of it.—As a food, physicians condemn the too free use of cheese. When new, it is extremely difficult of digestion: when old, it becomes acid and hot; and, from Dr Percival's experiments, is evidently of a septic nature. It is a common opinion, that old cheese digests every thing, yet is left undigested itself; but this is without any solid foundation.—Cheese made from the milk of sheep digests sooner than that from the milk of cows, but is less nourishing; that from the milk of goats digests sooner than either, but is also the least nourishing. In general, it is a kind of food fit only for the laborious, or those whose organs of digestion are strong.

Every country has places noted for this commodity:

thus Chester and Gloucester cheese are famous in England; and the Parmesan cheese is in no less repute abroad, especially in France. This sort of cheese is entirely made of sweet cow-milk: but at Rochefort in Languedoc, they make it of ewe's milk; and in other places it is usual to add goat or ewe's milk in a certain proportion to that of the cow. There is likewise a kind of medicated cheese made by intimately mixing the expressed juice of certain herbs, as sage, baum, mint, &c. with the curd before it is fashioned into a cheese.—The Laplanders make a sort of cheese of the milk of their rein-deer; which is not only of great service to them as food, but on many other occasions. It is a very common thing in these climates to have a limb numbed and frozen with the cold; their remedy for this is the heating an iron red hot, and thrusting it through the middle of one of these cheeses; they catch what drops out, and with this anoint the limb, which soon recovers it. They are subject also to coughs and diseases of the lungs, and these they cure by the same sort of medicine: they boil a large quantity of the cheese in the fresh deer's milk, and drink the decoction in large draughts warm several times a day. They make a less strong decoction of the same kind also, which they use as their common drink, for three or four days together, at several times of the year. They do this to prevent the mischiefs they are liable to from their water, which is otherwise their constant drink, and is not good.

The hundred weight of cheese pays on importation 1s. 3½ d. and draws back on exportation 1s. 1½ d. at the rate of 6s. 8d. The cheese of Ireland is prohibited to be imported.

CHEESE-Rennet. See **GALLIUM**.

CHEIRANTHUS, STOCK-GILLIFLOWER, or *Wall-flower*; a genus of the filiquosa order, belonging to the tetradynamia class of plants. The species are 13, but the following three are most worthy of notice. 1. The cheiri or common wall-flower, with ligneous, long, tough roots; an upright, woody, abiding stalk, divided into many erect angular branches, forming a bushy head from one to two feet high, closely garnished with spear-shaped, acute, smooth leaves, and all the branches terminating in long erect spikes of numerous flowers, which in different varieties are yellow, bloody, white, &c. 2. The incanus, or hoary cheiranthus, with ligneous, long, naked, white roots; and upright, strong, woody, abiding stem, from one to three feet high, branchy at top, adorned with long, spear-shaped, obtuse, hoary leaves; and the top of the stalk and all the branches terminated by erect spikes of flowers from one to two or three feet long, of different colours in different varieties. 3. The annuus, or ten-weeks-stock, with an upright, woody, smooth stalk, divided into a branchy head, 12 or 15 inches high, garnished with spear-shaped, blunt, hoary leaves, a little indented, and all the branches terminated by long erect spikes of numerous flowers of different colours in different varieties.—The two first sorts are very hardy evergreen biennials or perennials; but the last is an annual plant, so must be continued by seed sown every year; and even the two first, notwithstanding their being perennial, degenerate so much in their flowers after the first year, that it will be proper also to raise an annual

* See *Griment*.

Chekao
Cheke.

annual supply of them. The seeds are to be sowed only from the plants with single flowers; for the double ones bring no seeds to perfection. The seeds are to be chosen from such flowers as have five, six, or more petals, or from such as grow near to the double ones. They may be sown in the full ground in the spring, and may be afterwards transplanted. When fine doubles of the two first kinds are obtained, they may be multiplied by slips from the old plants.

CHEKAO, in natural history, the name of an earth found in many parts of the East Indies, and sometimes used by the Chinese in their porcelain manufactures. It is a hard and stony earth; and the manner of using it is this: they first calcine it in an open furnace, and then beat it to a fine powder. This powder they mix with large quantities of water: then stirring the whole together, they let the coarser part subside; and pouring off the rest yet thick as cream, they leave it to settle, and use the matter which is found at the bottom in form of a soft paste, and will retain that humidity a long time. This supplies the place of the earth called *boache*, in the making of that elegant sort of china-ware which is all white, and has flowers which seem formed by a mere vapour within its surface. The manner of their using it is this: they first make the vessel of the common matter of the manufacture; when this is almost dry, they paint upon it the flowers, or whatever other figures they please, with a pencil dipped in this preparation of the chekao; when this is thoroughly dry, they cover the whole vessel with the varnish in the common way, and bake it as usual. The consequence is, that the whole is white: but the body of the vessel, the figures, and the varnish, being three different substances, each has its own particular white; and the flowers being painted in the finest white of all, are distinctly seen through the varnish upon the vessel, and seem as if traced by a vapour only. The *hoache* does this as well as the chekao; and has besides this the quality of serving for making the porcelain ware either alone, or in the place of kaolin: the chekao has not this property, nor any other substance besides this *hoache*, which appears to be the same with our steatites or soap-rock.

CHEKE (Sir John), a celebrated statesman, grammarian, and divine, of an ancient family in the Isle of Wight, was born at Cambridge in the year 1514, and educated at St John's college in that university; where, after taking his degrees in arts, he was first chosen Greek lecturer, and in 1540 professor of that language, with a stipend of 40 l. a-year. In this station he was principally instrumental in reforming the pronunciation of the Greek language, which, having been much neglected, was imperfectly understood. About the year 1543 he was incorporated master of arts at Oxford, where, we are told, he had studied for some time. In the following year he was sent to the court of king Henry VIII. and appointed tutor for the Latin language, jointly with Sir Anthony Cooke, to prince Edward, about which time he was made canon of the college newly founded in Oxford; wherefore he must have now been in orders. On the accession of his royal pupil to the crown, Mr Cheke was first rewarded with a pension of 100 marks, and afterwards obtained several considerable grants from the crown. In

Che-kyang
Cheke.

1550 he was made chief gentleman of the privy-chamber, and was knighted the following year; in 1552, chamberlain of the exchequer for life; in 1553, clerk of the council; and soon after secretary of state and privy-counsellor. But these honours were of short duration. Having concurred in the measures of the duke of Northumberland for setting the crown on the unfortunate Jane Grey, and acted as her secretary during the nine days of her reign, on the accession of queen Mary, Sir John Cheke was sent to the tower, and stripped of the greatest part of his possessions. In September 1554 he obtained his liberty, and a licence from her majesty to travel abroad. He went first to Basil, thence to Italy, and afterwards returned to Strasburg, where he was reduced to the necessity of reading Greek lectures for subsistence. In 1556 he set out in an evil hour to meet his wife at Brussels; but, before he reached that city, he was seized by order of king Philip II. woodwinded, and thrown into a waggon; and thus ignominiously conducted to a ship, which brought him to the tower of London. He soon found that religion was the cause of his imprisonment; for he was immediately visited by two Romish priests, who piously endeavoured to convert him, but without success. However, he was at last visited by Fleckenham; who told him from the queen, that he must either comply or burn. This powerful argument had the desired effect; and Sir John Cheke accordingly complied in form, and his lands, upon certain conditions, were restored: but his remorse soon put an end to his life. He died in September 1557, at the house of his friend Mr Peter Osborne in Woodstreet, London, and was buried in St Alban's church. He left three sons, the eldest of which, Henry, was knighted by queen Elizabeth. He wrote 1. A Latin translation of two of St Chrysostom's homilies. Lond. 1543, 4to. 2. The Hurt of Sedition. Lond. 1549, 1576, 1641. 3. Latin translation of the English communion service. Printed among Bucer's opuscula. 4. De pronunciatione Græcæ. Basil, 1555, 8vo. 5. Several letters published in his life by Strype; and a great number of other books.

CHE-KYANG, or TSEKIAN, a province of the empire of China, formerly the residence of the Chinese monarchs, and one of the most considerable in the whole empire. It is bounded on the south by Fo-kyen; on the north and west, by Kyang-nan, and Kyang-si; and on the east by the sea. It extends itself from the 27th to the 31st degree of North Latitude, and from 116° to almost 120° of East Longitude, according to the meridian of Paris. The climate of it is serene and healthy, and the inhabitants very numerous, amounting, according to their registers, to 4,525,700 men. The country is exceedingly rich and fertile, beautifully variegated with well cultivated mountains, fruitful valleys and plains; so that there is not a spot which is not turned to the best advantage. It is intersected by a multitude of rivers and canals; the last cut wide and deep, and lined on both sides with hewn stone. The plains on both sides have a communication with each other by a vast number of bridges, so that one may travel through the whole province either by land or water. A vast quantity of silk is manufactured in this province; which is here finer, more rich and

Chelidonium
um
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Chelm. Red Russia. E. Long. 23. 30. N. Lat. 51. 25. Chelmsford
|
Chelmise.

curiously wrought with gold and silver, than in any other; and yet is so cheap, that a good silk suit will cost less than one of the most ordinary cloth in Europe. The tribute of silk paid to the emperor is said to amount to 370,466 pounds raw, and 2574 wrought, besides some other quantities of the finest, sent as a present to the court by the imperial barges. The province hath eleven capital cities, or cities of the first rank, and 77 of the second and third rank; besides 18 fortresses, most of them upon the sea-coasts, and large and populous enough to pass in other countries for considerable cities. The inhabitants are ingenious, polite, and courteous to strangers, but very superstitious.

CHELIDONIUM, CELANDINE, and HORNED or PRICKLY POPPY, a genus of the monogynia order, belonging to the polyandria class of plants. There are six species, none of which are remarkable for their beauty; but one of them, *viz.* the majus, is an article in the materia medica. It grows on old walls, among rubbish, and in waste shady places. The herb is of a bluish green colour; the root of a deep red; and both contain a gold-coloured juice: their smell is disagreeable, the taste somewhat bitterish, very acrid, burning and biting the mouth; the root is the most acrid. The juice takes off warts; cures tetters, ring-worms, and the itch; and, diluted with milk, it consumes opaque white spots on the eye.—Horses, cows, goats, and swine, refuse to eat the herb.

CHELIDONIUS LAPIS, in natural history, a stone said by the ancients to be found in the stomachs of young swallows, and greatly cried up for its virtues in the falling-sickness; but, from their description, it appears to be only a species of lycodonte, or bufonite. See **LYCODONTES**, and **BUFONITE**.

CHELM, a town of Poland, capital of a palatinate of the same name. It is situated in the province of

Red Russia. E. Long. 23. 30. N. Lat. 51. 25.

CHELMSFORD, the county town of Essex, situated on the river Chelmer, in E. Long. 30. N. Lat. 51. 40. It sends two members to parliament.

CHELONE, in botany, a genus of the angiosperma order, belonging to the didymia class of plants. There are three species, *viz.* the Glabra, the Hirsuta, and the Penilemon. They are natives of North America; and are herbaceous flowery perennials, with upright stalks two feet high, decorated with spear-shaped leaves, and beautiful spikes of monopetalous, ringent flowers, red, rose-coloured, blue, and purple. They flower from September to November, and are sometimes succeeded by ripe seeds in this country. They are very hardy plants, and may be propagated by seeds sown in any soil or situation; but the two first multiply so fast by their creeping roots, that the seeds are seldom regarded.

CHELSEA, a fine village situated on the northern bank of the river Thames, a mile westward of Westminster, remarkable for a magnificent hospital of invalids and old decrepit soldiers; and a pleasure-house, called Ranelagh, to which a great deal of fine company resort in summer.

CHELTENHAM, or CHILTENHAM, a market-town of Gloucestershire, seven miles north-east of Gloucester. W. Long. 2. 10. N. Lat. 51. 50. It is chiefly remarkable for its mineral waters, of the same kind with those of Scarborough. See **SCARBOROUGH**.

CHEMISE, in fortification, the wall with which a bastion, or any other bulwark of earth, is lined for its greater support and strength: or it is the solidity of the wall from the talus to the stone-roy.

Fire-CHEMISE, a piece of linen cloth, steeped in a composition of oil of petrol, camphor, and other combustible matters, used at sea, to set fire to an enemy's vessel.

C H E M I S T R Y

¹ Definition. **MAY** be defined, The study of such phenomena or properties of bodies as are discovered by variously mixing them together, and by exposing them to different degrees of heat, alone, or in mixture, with a view to the enlargement of our knowledge in nature, and to the improvement of the useful arts: or, It is the study of the effects of heat and mixture upon all bodies, whether natural or artificial, with a view to the improvement of arts and natural knowledge.

² Antiquity. The science of chemistry is undoubtedly of very high antiquity; and, like most other sciences, its origin cannot be traced. In scripture, Tubal Cain, the 8th from Adam, is mentioned as the father or instructor of every artificer in brass or iron. This, however, does not constitute him a chemist, any more than a founder or blacksmith among us has a right to that title. The name of chemist could only belong to him, whoever he was, who first discovered the method of extracting metals from their ores; and this person must necessarily have lived before Tubal Cain, as every blacksmith or founder must have metals ready pre-

pared to their hand. Nevertheless, as Tubal Cain lived before the flood, and the science of chemistry must have existed before his time, some have conjectured, that the metallurgic part of chemistry, on account of its extreme usefulness to mankind, was revealed to Adam by God himself.

Be this as it will, *Siphoas*, an Egyptian, is considered by the chemists as the founder of their science. He was known by the Greeks under the name of *Hermes*, or *Mercurius Trismegistus*; and is supposed to have lived more than 1900 years before the Christian era. A numerous list of this philosopher's works is given by Clemens Alexandrinus; but none of them are now to be found, nor do any of them appear to have been written professedly on chemistry.

Two illustrious Egyptians, of the name of *Hermes*, are recorded by ancient authors. The elder supposed to be the same with *Mizraim*, the grandson of Noah, the *Hermes* of the Greeks, and *Mercury* of the Romans. The younger *Hermes* lived a thousand years afterwards, and is supposed to have restored the sciences after they had fallen into oblivion, in consequence

³ Science founded.

quence of an inundation of the Nile. No less than 36,000 books are said to have been written under the name of Hermes; but, according to Jamblichus, a custom prevailed of inscribing all books of science with the name of Hermes. Some authors deny the existence of Hermes, and maintain that his history is allegorical.

4
Moses sup-
posed to be
skilled in
chemistry.

As the science of chemistry is supposed to have been well known to the Egyptians, Moses, who was skilled in their wisdom, is thence ranked among the number of chemists; a proof of whose skill in this science is thought to be, his dissolving the golden calf made by the Israelites, so as to render it potable.

Of all the Greeks who travelled into Egypt, in order to acquire knowledge, Democritus alone was admitted into their mysteries. The Egyptian priests are said to have taught him many chemical operations; among which were the art of softening ivory, of vitrifying flints, and of imitating precious stones.

Very little, however, can be gathered from any of the more ancient authors concerning the progress of this science; but as there is no instance of any nation in the world which was totally destitute of metals, we are assured that the metallurgic part of chemistry must have been known to some persons in every age, and every nation; nor have we the least reason to imagine that the knowledge of metallurgy, in these early ages, was at all inferior to what it is at present. In the sacred writings, allusions are very frequently made by the prophets to the methods of refining silver, and particularly to the blowing of bellows upon the surface of it, in order to drive off the baser metals scorified, and reduced to a calx by the violent action of the heat. By the manner in which these things are spoken, it would seem that the knowledge of them was pretty general, as much indeed as it is just now.

5
Alchemy.

In the fourth and fifth centuries, some of the Greek writers speak of an art, as then generally known, of transmuting the baser metals into gold; and, in the end of the 13th century, when the learning of the eastern countries was brought into Europe by the Arabians, the pretensions to a knowledge of transmutation of metals began likewise to spread into this quarter of the world. The art itself, called *Alchemy*, is supposed to have been of Egyptian original; and it is probable, that when the ancient Greek philosophers travelled into Egypt, they brought back some of the allegorical language of the Egyptian art ill understood, which afterwards passed into their mythology.

The science of alchemy seems to have been the earliest branch of philosophic chemistry, as being originally speculative; whereas, in all other parts of chemical knowledge, facts seem to have preceded reasoning. Success in alchemy was thought impossible, without a previous knowledge of the nature, essence, and principles of metals; whence they are produced in the mines, whence they received their increase, &c.

The general principles of metals were supposed to have been two, *viz.* mercury and sulphur; of both which, particularly of the latter, there were different kinds. In gold it was pure, red, fixed, and incombustible; but of different qualities in the other metals. The principles of gold they imagined to be scattered

in certain other bodies; and these they laboured to collect and unite, in order to the composition of the precious metal. The alchemists did not stop here; they pretended to a product of a higher order, called the *elixir*, the *medicine for metals*, the *tincture*, the *philosopher's stone*; which by being projected on a large quantity of any of the inferior metals in fusion, should change them into pure gold; being laid upon a plate of silver, copper, or iron, and moderately heated, should change into gold all the places to which it was applied; and on being properly treated with pure gold, should change it into a powder of the same virtue and efficacy with itself; and which, by continued coction, should have its virtue more and more exalted, so as at last to be able to change into pure gold 272,330 parts of base metal.

Pretensions of this kind carry along with them such an air of absurdity, that it is not at present worth while to say any thing further concerning them, than that they have at last fallen into universal discredit, though not sooner than the last century.

In the sixteenth century, chemistry was first introduced into physic by Paracelsus, who added a new species of folly to that of his predecessors. This was an imagination, that by alchemy an universal medicine might be discovered, by which the human life could be prolonged to any length of time whatever. But, though Paracelsus, and his disciple Van Helmont, both pretended to have been in possession of this remedy, the one died at the age of 48, and the other at that of 63 years.

This notion of an universal remedy, absurd as it was, found many partisans; and the books of the chemists were now filled with receipts for making potable gold, elixirs of life, panaceas, &c. but written in unintelligible language.

Happily the taste for knowledge, which at last began to succeed the jargon and ignorance of preceding ages, awakened men to inquiries concerning the most important and essential operations of chemistry.

Agricola is one of the first and best authors on the subject of metallurgy. Being born in a village in Misnia, a country abounding in mines and metallurgic works, he described them exactly and copiously. He was a physician, and cotemporary with Paracelsus, but of a character very different. His writings are clear and instructive, as those of Paracelsus are obscure and useless. Lazard, Erker, Schinder, Schlutter, Henkel, &c. have all written on metallurgy, and described the art of assaying metals. Anthony Nevi, Dr Merret, and the famous Kunkel, (who discovered the phosphorus of urine) have described very fully the arts of making glass, enamels, imitations of precious stones, &c.; but their writings, as well as those of succeeding chemists, are not free from the illusions of alchemy; so true it is, that an obstinate and inveterate malady never disappears at once, without leaving traces behind. Soon after, however, the alchemical phrenzy was attacked by many powerful antagonists, who contributed to rescue the science of chemistry from an evil which at once disgraced it, and retarded its progress. Among these, the most distinguished are Kircher a Jesuit, and Conningins a physician, who wrote with much success and reputation.

6
Chemistry introduced into medicine, and an universal remedy imagined.

7
Chemistry emerges from its obscurity.

About the middle of the last age, several of the parts of chemistry began to be collected, examined, and compared, with a view to discover their principles, and observe their relations, so as to unite them into one body of rational doctrine. This, which we may consider as the foundation of chemistry, considered as a science, was first begun by *James Barner*, physician to the king of Poland, who arranged into order the principal chemical experiments, and added rational explanations. His work is intitled *Philosophical Chemistry*. The phenomena of this science are there referred to the system of alkalis and acids, established by Tachenius, but abused by being too far extended. A valuable treatise on chemistry was also published by Bohnius, professor at Leipzig; and Becher, principal physician to the electors of Mentz and Bavaria, has

laid down the most satisfactory theory ever published; and which has been adopted by almost all succeeding philosophical chemists, particularly Stahl, who has shewn it to be the most enlightening, and the most conformable to the phenomena of chemistry of any thing of the kind ever published.

From this time the science of chemistry has advanced prodigiously. A true theory, arising from experiments already made, has led to numberless new ones; and the labours of the learned Boerhaave, Boyle, Newton, &c. have contributed to lay a foundation for the improvements made by the celebrated chemists of the present time, from whose new discoveries it is to be hoped, that the science will still continue to advance, many useful arts to be improved, and the operations of nature to be more and more understood.

PART I. THEORY OF CHEMISTRY.

8
Perfect
Theory,
what.

ACCORDING to the definition we have given of this science, the theory of it ought to consist in a thorough knowledge of all the phenomena which result from every possible combination of its objects with one another, or from expelling them in all possible ways to those substances which chemists have found to be the most active in producing a change. So various, however, and so widely extended are the objects of chemistry, (comprehending all terrestrial bodies whatever), that a knowledge of this kind is utterly unattainable by man. The utmost that can be done in this case is, to give some account of the phenomena which accompany the mixtures of particular substances, or the appearances they put on when exposed to heat, which have been already so well ascertained that they may now be laid down as rules, whereby we may, with a good deal of certainty, judge of the event of our experiments, even before they are made.

9
Objects of
Chemistry,
what.

Here we must observe, that though the objects of chemistry are as various as there are different substances in the whole system of nature, yet they cannot all be examined with equal ease. Some of these substances act upon others with great violence; and the greater their activity, the more difficultly are they themselves subjected to a chemical examination. Thus, fire, which is the most active body in nature, is so little the subject of examination, that it hath hitherto baffled the ingenuity of the greatest philosophers to understand its composition; (see FIRE.) This substance therefore, though it be the principal, if not the only agent in chemistry, is not properly an object of it, because it cannot be made a subject of any chemical operation.

10
Supposition
of elements
the origin
of alchemy.

It hath been customary to consider all bodies as composed of certain permanent and unchangeable parts, called elements; and that the end of chemistry was to resolve bodies into these elements, and to re-compose them again by a proper mixture of the elements when so separated. Upon this supposition the alchemists went; who, supposing that all bodies were composed of salt, sulphur, and mercury, endeavoured to find out the proportions in which these existed in gold, and then to form that metal by combining them in a similar manner. Had they taken care to ascertain the real existence of their elements, and, by mixing them together, composed any one body whatever;

though but a grain of lead, the least valuable of all metals, their pretensions would have been very rational and well founded; but as they never ascertained the existence of such elementary bodies, it is no wonder that their labours were never attended with success.

11
Mr Boyle's
opinion.

Another set of elements which were as generally received, and indeed continue to be so in some measure to this day, are fire, air, earth, and water.—This doctrine of elements was strenuously opposed by Mr Boyle; who endeavoured to prove, that fire was not an element *per se*, but generated merely from the motion of the particles of terrestrial bodies among one another, (see FIRE); that air was produced from the substance of most solid bodies; and that water, by a great number of distillations; was converted into earth. His arguments, however, concerning fire were not at all conclusive; nor does the expulsion of air from fixed bodies prove that any of their solid parts were employed in the composition of that air, as later discoveries have shewn that air may be absorbed from the external atmosphere, and fixed in a great number of solid substances. His assertion concerning water deserves much consideration, and the experiment is well worth repeating; but it does not appear that he, or any other person, ought to have relied upon the experiment which was intended to prove this transmutation. The fact was this. Having designed to try the possibility of reducing water to earth by repeated distillations, he distilled an ounce of water three times over himself, and found a small quantity of earth always remaining. He then gave it to another, who distilled it 197 times. The amount of earth from the whole distillations was six drachms, or $\frac{1}{2}$ of the quantity of water employed; and this earth was fixed, white, and insoluble in water.—Here it is evident, that great suspicions must lie against the fidelity of the unknown operator, who no doubt would be wearied out with such a number of distillations. The affair might appear trivial to him; and as he would perhaps know to which side Mr Boyle's opinion inclined, he might favour it, by mixing some white earth with the water. Had the experiment been tried by Mr Boyle's own hand, his known character would have put the matter beyond a doubt.

12
Existence of
elements
disputed.
as

Even the existence of earth as an element, appears

THEORY.

THEORY.

15
Chemical
attraction.

as dubious as that of the others; for it is certain that there is no species of earth whatever, from which we can produce two dissimilar bodies, by adding their other component parts.—Thus, the earth of alum has all the characters of simplicity which we can desire in any terrestrial substance. It is white, insipid, inodorous, and perfectly fixed in the fire; nevertheless, it seems to be only an element of that particular body called alum: for though alum is composed of a pure earth and vitriolic acid joined together, and Epsum salt and selenite are both composed of a pure earth combined with the same acid; yet by adding oil of vitriol to the earth of alum, in any possible way, we shall never be able to form either Epsum salt or selenite. In like manner, though all the imperfect metals are composed of inflammable matter joined with an earthy basis; yet by adding to earth of alum any proportion we please of inflammable matter, we shall never produce a metal; and what is still more mortifying, we can never make the earthy basis of one metallic substance produce any other metal than that which it originally composed. See EARTH.

13
Elements
necessarily
invisible.

A little consideration upon the subject of elements will convince us, not only that no such bodies have ever yet been discovered, but that they never will; and for this plain reason, that they must be in their own nature invisible.—The component parts of any substance, may with propriety enough be called the elements of that substance, as long as we propose carrying the decomposition no farther; but these elements have not the least property resembling any substance which they compose. Thus, it is found that the compound salt called *sal ammoniac* is formed by the union of an acid and an alkali: we may therefore properly enough call these two the elements of *sal ammoniac*; but, taken separately, they have not the least resemblance to the compound, which is formed out of them. Both the acid and alkali are by themselves so volatile as to be capable of diffipation into an invisible vapour by the heat of one's hand; whereas, when joined together, they are so fixed as almost to endure a red heat, without going off. If, again, we were to seek for the elements of the acid and alkali, we must not expect to find them have any properties resembling either an acid or an alkali, but others quite different; and if we could discover any thing which was the common element of *all* bodies, we believed to find a substance which had no property in common with any other in the whole system of nature, and consequently behaved to be imperceptible.

14
Supposition
concerning
phlogiston.

To the above mentioned four elements, *viz.* fire, air, earth, and water, a kind of *fifth* element has generally been added, but not usually distinguished by that name, though it has apparently an equal, if not a greater, right to the title of an *element* than any of the others. This substance is called the *phlogiston*, or inflammable principle; on which the ignition of all bodies depends. Some have imagined this substance to be the same with fire, or the matter of heat and light; but very absurdly: for the phlogiston is always displaced, and to appearance destroyed by fire; which it could not be if itself were either heat or light. See PHLOGISTON.

Before we proceed to give a general theory of the

changes which happen upon the mixtures of different bodies together, or expoding them singly to heat, we must observe, that all of them depend on certain qualities in bodies, by which some of them are apt to join together and to remain united while they have an opportunity. The cause of these qualities is totally unknown; and therefore, philosophers, after the example of Sir Isaac Newton, have expressed the apparent effect of this unknown cause by the word *attraction*. From them the word has been adopted by the chemists; and is now generally used in speaking of the phenomena which are observed in the mixture of different substances.

This attraction is not equally strong between all substances; in consequence of which, if any body is compounded of two others, and another is presented to it which has a greater attraction for one of the component parts than they have for one another, the substance will be *decomposed*. A new compound is then formed by the union of that third substance with one of the component parts or *elements* (if we please to call them so) of the first. If the attraction between the body superadded, and either of the component parts of the other, is not so strong as that between themselves, no decomposition will ensue; or if the third substance is attracted by both the others, a new composition will take place by the union of all the three.

16
Objects of
chemistry,
how clas-
sified.

The objects of chemistry, as we have already observed, are so various, that an enumeration of them all is impossible. To ease the mind therefore, when speaking of them, and render more useful any thing that is said or wrote on chemistry, it is necessary to divide them into different classes, comprehending in each class those bodies which have the greatest resemblance to one another, and to which one common rule applies pretty generally.—The division formerly used, was that of vegetables, animals, and minerals; but this has been thought improper, as there are many substances in each of those kingdoms which differ very widely from one another, and which are by no means subject to the same laws. The most approved method, at present, of arranging the objects of chemistry is into Salts; earths; metals; inflammable substances; waters; animal, and vegetable, substances.

SECT. I. Salts.

17
Salts.

I. Salts are either *sublime*, that is capable of abiding the fire, and melting in a strong heat, without being dissipated; or *volatile*, that is, being dispersed in vapour with a small heat. Their other properties are, that they are soluble in water; not inflammable, unless by certain additions; and give a sensation of taste, when applied to the tongue.

The most general characteristic of salts is, that they are all soluble in water, though some of them much more difficultly than others. Most of them have likewise the property of forming themselves, in certain circumstances, into solid transparent masses of regular figures, different according to the different salt made use of, and which are termed *crystals* of that salt. In this state they always contain a quantity of water; and therefore the utmost degree of purity in which a salt can be procured, is when it has been well crystallized, and the crystals are freed of their superfluous moisture

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18
Phenomena
attending
their solu-
tion.

moisture by a gentle heat. They generally appear then in the form of a white powder.

In the solution of salts in water, the first thing observable is, that the water parts with the air contained in it; which immediately rises to the top, in the form of bubbles. This, however, is most remarkable when the salt is in the dry form we have just now mentioned, because there is always a quantity of air entangled among the interfaces of the powder, which rises along with the rest; and this discharge of air is sometimes so great, as to be mistaken for an effervescence. From this however, it is essentially different. See EFFERVESCENCE.

Another thing observable in the solution of salts is, that a considerable change happens in the temperature of the water in which they are dissolved; the mixture becoming either a good deal warmer or colder than either the salt or the water were before. In general, however, there is an increase of cold, and scarce any salt produces heat, except when it has been made very dry, and deprived of that moisture which it naturally requires; and thus the heating of salts by being mixed with water may be explained on the same principle with the heat produced by quick-lime. See QUICKLIME.

After salt has been dissolved in a certain quantity by water, no more of that salt will be taken up, unless the water is heated; and as long as the heat continues to increase, the salt will be dissolved. When the water boils, at which time it has attained its greatest heat, and will take up no more salt, it is then said to be *saturated* with that salt. This, however, does not prevent it from taking up a certain quantity of another salt, and after that perhaps of a third, or fourth, without letting go any of the first which it had dissolved. How far this property of water extends, has not yet been ascertained by experiments.

To the above rule there is only one exception known as yet; namely, common sea-salt: for water dissolves it in the very same quantity when cold, as when boiling hot. It has been said by some, that all deliquescent salts, or those which grow moist on being exposed to the air, had the same property: but this is found to be a mistake.

19
Mixture and separation
of salts.

This property of solubility, which all the salts possess in common, renders them easily miscible together; and the property by which most of them shoot into crystals renders those easily separable again which have no particular attraction for one another. This is likewise rendered still more easy by their requiring different proportions of water, and different degrees of heat, to suspend them; for by this they crystallize at different times, and we have not the trouble of picking the crystals of one out among those of the other.

20
Hypothesis
concerning
the solution
of salts.

The manner in which the solution of salts in water is effected, is equally unaccountable with most of the other operations of nature. Sir Isaac Newton supposed that the particles of water got between those of the salt, and arranged them all at an equal distance from one another: and from this he also accounts for the regular figures they assume on passing into a crystalline form; because, having been once arranged in an orderly manner, they could not come together in

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disorder, unless something was to disturb the water in which they were suspended; and if any such disturbance is given, we find the crystals are by no means so regular as otherwise they would have proved. Others have thought that these figures depend on a certain *polarity* in the very small particles into which the salt is resolved when in a state of solution. These things, however, are merely conjectural; neither is it a matter of any consequence to a chemist whether they are right or wrong.

Though solution is that operation which salts undergo the most easily, and which should seem to affect them the least of any, a repetition of it proves nevertheless very injurious to them, especially if it is followed by quick evaporation; and the salt, instead of being crystallized, is dried with a pretty strong heat. Newman relates, that a pound of sea-salt was reduced by 13 solutions, and exsiccations, to half an ounce; and even that was mostly earth. Where solution is required, therefore, it ought always to be done in close vessels, in which also the subsequent evaporation should be performed, (see EVAPORATION); and in all cases where crystallization is practicable, it ought to be preferred to violent exsiccation.

21
Salts de-
structible
by repeated
solutions.

The two great divisions of salts are into acids and alkalis. The first of these are known by their peculiar taste, which is called *acid*, or *sour*. They are not found in a solid form; neither are any of them, except the acids of vitriol, of tartar, of phosphorus, and of borax, capable of being reduced to solidity. The others, when highly concentrated, that is, brought to the utmost degree of strength of which they are capable, always become an invisible vapour, permanently elastic, until it comes in contact with water, or some other substance with which they are capable of uniting. For such acids the name of *salts* seems less proper, as we can scarcely say that a *vapour*, which is already much more fluid than water, can be *dissolved* in that element.

22
Acids.

The acids are divided into the mineral, the vegetable, and the animal; expressing their different origin, or where they are most commonly to be found. The mineral acids are commonly reckoned three; the vitriolic, the nitrous, and the marine. To this the acid of borax ought to be added; but its weakness makes it much less taken notice of as an acid than the others. A Swedish chemist, however, Mr Scheele, hath lately added a new acid to the number of the mineral ones, under the name of the *fluor acid*.

The vegetable kingdom affords only two distinct species of acids. The one appears fluid, and when concentrated to the utmost degree becomes an invisible vapour. This is produced from fermented liquors, under the name of *vinegar*. An acid similar to this, and which is thought not to be essentially different from it, is found in the juices of certain fruits, as lemons, &c. and is extracted from most vegetables by distillation with a strong fire. The other is likewise a consequence of fermentation; and crusts on the bottom and sides of casks in which wine is put to dehydrate itself. In its crude state it is called *tartar*; and when afterwards purified, is called the *cream*, or crystals, of tartar.

The animal acids, which have hitherto been discovered,

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vered, are only two; the acid of ants, and that of urine, which is also the acid of phosphorus. The first of these is volatile; and consequently must be supposed a vapour; when in its strongest state the other is exceedingly fixed; and will rather melt into glass, than rise in vapours. Besides these, it is said an acid is contained in blood; in wasps, bees, &c.: but no experiments have as yet been made on these to determine this matter with any degree of precision.

23
Alkalies.

The alkalies are of two kinds; fixed and volatile. The fixed kind are subdivided into two; the vegetable, and mineral or fossil alkali. The vegetable is so called, because it is procured from the ashes of burnt vegetables; the fossil, because it is found native in some places of the earth, and is the basis of sea-salt, which in some places is dug out of mines in vast quantity. They are called *fixed*, because they endure a very intense degree of heat without being dissipated in vapour, so as even to form a part of the composition of glass. The volatile alkali is generally obtained by distillation from animal substances. In its pure state this alkali is perfectly invisible; but affects the sense of smelling to such a degree, as not to be approached with safety.

24
Different
action of
alkalies and
acids.

The acids and alkalies are generally thought to be entirely opposite in their natures to one another. Some, however, imagine them to be extremely similar, and to be as it were parts of one substance violently taken from each other. Certain it is, that when separated, they appear as opposite to one another, as heat and cold. Their opposite action indeed very much resembles that of heat and cold, even when applied to the tongue; for the alkali has a hot, bitter, burning taste, while the acid, if not considerably concentrated, always gives a sensation of coldness. In their action too upon animal substances, the alkali dissolves, and reduces the part to a mucilage; while the acid, if not very much concentrated, tends to preserve it uncorrupted.

25
Neutral
salts.

If an alkaline salt, and moderately strong acid in a liquid state, be mixed together, they will immediately unite; and, provided the alkali has not been deprived of its fixed air, their union will be attended with a very considerable effervescence: (see AIR, n° 13). If the alkali has been deprived of air, no effervescence will ensue, but they will quietly mix together; but if a due proportion of each has been added, the liquor will neither have the properties of an acid nor an alkali, but will be what is called *neutral*. The bringing the liquor into this state, is called *saturating* the acid, or alkali, or combining them to the point of saturation.

If the liquor after such a saturation be gently evaporated, a saline mass will be left, which is neither an acid nor an alkali, but a new compound formed by the union of the two, and which is called a *perfect neutral salt*. The epithet *perfect* is given it, to make a distinction between the salts formed by the union of an acid and an alkali, and those formed by the union of acids with earthy or metallic substances; for these will likewise unite with acids, and some of the compounds will likewise crystallize into regular figures; but, because of their weaker union with these substances, the salts resulting from combinations of this kind are called *imperfect*.

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26
Vegetable
colours
changed by
acids and
alkalies.27
Differences
in the de-
grees of at-
traction be-
tween acids
and alkalies.

All acids, the volatile sulphureous one excepted, change the blue infusions of vegetables, such as violets, to a red; and alkalies, as well as some of the imperfect neutrals, change them green. This is the nicest test of an acid or alkali abounding in any substance, and seems the most proper method of determining whether a solution intended to be neutral really is so or not.

Though between every acid and alkali there is a very strong attraction, yet this is far from being the same in all; neither is it the same between the same acid and alkali in different circumstances of the acid. When the acids are in a liquid state, and as free as possible of inflammable matter, between which and the nitrous and vitriolic acids there is a very strong attraction, the vitriolic acid will expel any of the rest from an alkaline basis, and take its place. Thus, if you combine the acid of sea-salt, or marine acid, to the point of saturation, with the fossil alkali, a neutral salt will be formed, which has every property of common salt; but, if you pour on a certain proportion of the vitriolic acid, the acid of sea-salt will immediately be expelled; and the liquor, upon being evaporated, will contain not the neutral salt formed by an union of the marine acid with the alkali, but another consisting of the vitriolic acid joined with that alkali, and which has quite different properties from the former.

When the acids and alkalies are applied to one another in a liquid state, the vitriolic acid always shews itself to be the most powerful; but when applied in a solid form, and urged with a violent heat, the case is very much altered. Thus, the acid of borax, commonly called *sal sedativus*, is so weak as to be disengaged from its basis by every acid applied in a liquid form, that of tartar alone excepted; but if even the vitriolic acid combined with an alkali be mixed with this weak acid, then exsiccated, and at last urged with a vehement fire, the vitriolic acid will be disengaged from its basis, and rise in vapours, leaving the weaker acid in possession of the alkali. The same thing happens on adding the phosphoric or urinous acid, to combinations of the vitriolic or other acids with alkaline salts.—When the acids are in a liquid state, then, the most powerful is the vitriolic; next, the nitrous; then the marine; then vinegar; acid of ants; and lastly the *sal sedativus* and tartar, which seem to be nearly equal in this respect. As for the fluor acid, no great number of experiments have as yet been made upon it, and Dr Priestley hath rendered it very probable that this new acid is no other than the vitriolic.—If they are applied in a solid form, the most powerful are the *sal sedativus*, and phosphoric acid; then the vitriolic, nitrous, marine, and vegetable acids.

When they are reduced to vapour, the case is exceedingly different; for then the marine acid appears to be the most powerful, and the vitriolic the least of any. It is impossible, however, to preserve the vitriolic acid in the form of vapour, without combining it with a certain quantity of inflammable matter, which must necessarily destroy its strength. Dr Priestley, however, found, that the marine acid, when reduced to vapour, was capable of disuniting the nitrous acid from a fixed alkali.

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The

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28
Acids with
phlogiston.

The acids have the property of uniting themselves to many other substances besides fixed alkalies, and forming neutral compounds with them. Of these the chief is the principle of inflammability, or phlogiston. In the vitriolic, nitrous, and phosphoric acids, the attraction for this principle is very strong; so great, that the two former will even leave a fixed alkali to unite with it. In the marine acid it is less perceptible; in the liquid vegetable or animal acid still less; and in the acid of tartar, and fal sedativus, not at all.

29
With met-
als and
earth.

Besides this, all acids will dissolve metallic and earthy substances: with these, however, they do not in general unite so firmly as with alkaline salts; nor do they unite so strongly with metals as with earths.

30
Elective
attractions.

In general, therefore, we may expect, that after having dissolved a metal in any acid whatever, if we add an earthy substance to that solution, the acid will quit the metal which it had before dissolved, to unite with the earth. In this case the solution will not be clear, as before; but will remain muddy, and a quantity of powder will fall to the bottom. This powder is the metalline substance itself, but deprived of one of its component parts; and in this case it is said to *precipitate* in the form of a *calx*.

If to this new solution of the earthy substance in an acid liquor, a volatile alkaline salt, not deprived of its fixed air, is added, the acid will quit the earth, and unite with the alkaline salt. The earth thus disengaged will again *precipitate*, and lie at the bottom in fine powder, while the volatile alkali and acid remain combined together, and the liquor again becomes clear.

The attraction between volatile alkalies and acids is considerably less than between fixed alkalies and the same acids. If, therefore, a fixed alkali be now added to the liquor, the volatile alkali will be separated, and the acid will unite with the fixed alkali. The volatile alkali indeed, being perfectly soluble in water, cannot precipitate, but will discover its separation by the pungent smell of the mixture; and upon evaporating the liquor, the volatile alkali will be dissipated, and a saline mass consisting of the acid and fixed alkali will remain.

31
Detonation
of nitre.

Lastly, if the acid employed was the nitrous, which has a strong attraction for the principle of inflammability, if the saline mass be mixed with a proper quantity of inflammable matter, and exposed to a strong heat, the acid will leave the alkali with vast rapidity, combine with the inflammable matter, and be destroyed in flame in a moment, leaving the alkali quite pure.

32
Experiments
to the above
rules.

Though the above-mentioned effects generally happen, yet we are not to expect that they will invariably prove the same, whatever acid is made use of; or even that they will be the same in all possible variety of circumstances in which the same acid can be used.—The acid of tartar is one exception, where the general rule is in a manner reversed; for this acid will quit a fixed alkali for an earth, especially if calcined, and even for iron. If lead, mercury, or silver, are dissolved in the nitrous acid, and a small quantity of the marine acid is added, it will separate the stronger nitrous acid, and fall to the bottom with the metals, in form of a white powder.—The vitriolic acid,

by itself, has a greater attraction for earthy substances than for metals; and greater still for fixed alkaline salts than for either of these: but if quicksilver is dissolved in the nitrous acid, and this solution is poured into a combination of vitriolic acid with fixed alkali, the vitriolic acid will quit the alkali to unite with the quicksilver. Yet quicksilver by itself cannot easily be united with this acid.

SECT. II. Earths.

THESE are divided into five classes: 1. Absorbent, alkaline, or calcareous earths. 2. Argillaceous earths, or clays. 3. The stony. 4. The fusible earths; and, 5. The talcs.

1. The first class comprehends all those that are capable of being converted into lime. They are found of various degrees of hardness; but none of them are capable of totally resisting the edge of a knife, or striking fire with steel. They are found to consist of a very friable earth, joined with a large quantity of air, and some water. They effervesce with an acid when poured on them; by which they are distinguished from all other kinds of earth, except the argillaceous. When calcined by a strong fire, they part with the water and air which they contained, and then acquire a great degree of causticity, lose their power of effervescing with acids, and become what is called *quicklime*. They are soluble in acids, but not equally so in all. The vitriolic and tartareous acids form compounds with them very difficultly soluble; the *fenites*, formed by the vitriolic acid and calcareous earth, requiring, according to Mr Beauré, an ounce of water to dissolve a single grain of it. The solubility of the tartareous fenite, hath not yet been determined.—With the other mineral acids, the calcareous earths become easily soluble; and by proper management form concretes which appear luminous in the dark, and are called *phosphori*.

2. The argillaceous earths differ from the calcareous, in not being convertible into quicklime. When mixed into a paste with water, and exposed to the fire, they shrink remarkably, crack in many places, and become excessively hard. By being gently dried in the open air before they are turned, they do not crack, and thus may be formed into vessels of any shape. Of this kind of earth are formed all the brown sort of earthen ware. The purest kind of argillaceous earth naturally found, is that whereof tobacco-pipes are made.

All the argillaceous earths are soluble in acids. With the vitriolic they dissolve into a gelatinous tough liquor very difficultly crystallizable; but which, on the addition of some fixed or volatile alkali, may be flung into crystals of the salt called *alum*. With the other acids they form astringent salts of a similar nature.

The attraction between the argillaceous earths and acids is very weak, yielding not only to alkaline salts both fixed and volatile, but even to some metals, particularly iron; but these earths have as yet been but little the subject of chemical examination in this way. They have a remarkable property of absorbing the colouring matter of cochineal, Brazil-wood, &c. as have also the calces of some metals. See LAKE.

Both the calcareous and argillaceous, and indeed all earths

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33
General di-
vision.

34
Quicklime.

35
Argillace-
ous.

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earths when pure, resist the utmost violence of fire; but when mixed together will readily melt, especially if in contact with the burning fewel. Dr Lewis having made covers to some crucibles of clay and chalk mixed together, found, that they melted into a yellow glass, before the mixtures in the crucibles were fused in the least. But though they melted thus readily when in contact with the fewel, it was with great difficulty he could bring them to a transparent glass when put into a crucible. See GLASS.

The other species of earths, *viz.* the stony, fusible, and talcy, being no other way the subjects of chemistry than as they are subservient to the making of glass, all that can be said of them will most properly come under that article. For their different species, see MINERALOGY.

36
Anomalous
earths.

Besides the above mentioned species of earths, there are others which may be called *anomalous*, as having some resemblance of the calcareous and argillaceous, and yet being essentially different from them. These are the white earth called *magnesia alba*, the earth of burnt vegetables, and that produced from burning animal substances.

37
Magnesia.

Magnesia alba was at first prepared from the thick liquor remaining after the crystallization of nitre; and is now found to be contained in the liquor called *bittern*, which is left after the separation of common salt from sea-water. In the former case it was united with the *nitrous*, in the latter with the *vitriolic*, acid. It is also found naturally in the soft kind of stone called *steatites* or "soap-stone;" and in the concrete used for taking spots out of cloaths, called *French chalk*. It differs from the calcareous earths, in not acquiring any causticity when deprived of its air, of which it contains so large a quantity as to lose two-thirds of its weight when calcined. From the argillaceous it differs in not burning hard when mixed with water, nor forming a tough ductile paste. It is easily soluble in all the acids, even the vitriolic; with which it forms the bitter purging salt commonly called *Epsum salt*, from its being first discovered in the waters of Epsum. With all the other acids it likewise forms purgative compounds, which are either very difficultly or not at all crystallizable.—Like other pure earths, it cannot be melted by itself; but, on proper additions, runs into a beautiful green glass.

38
Vegetable
and animal
earths.

The earth of burnt vegetables is thought by Dr Lewis to be the same with magnesia alba; but on trying the common wood ashes, they were found to be very different. This kind of earth is fusible, by reason of the alkaline salts contained in it. Animal earth is both very difficult of solution in acids, and impossible to be melted in the strongest fire. It dissolves, however, in acid liquors, though slowly; but the nature of the compounds formed by such an union are as yet unknown. The softer parts of animals, such as blood, flesh, &c. are said to yield a more soluble earth than the others.

SECT. III. Inflammable Substances

39
Phenomena
on burning.

THESE comprehend all vegetable, animal, and some mineral substances. They are distinguished from all others, by emitting a gross thick smoke and flame,

when a certain degree of heat is applied. To this, however, spirit of wine and all preparations from it are exceptions. They burn without the least smoke; and if a glass bell is held over the burning spirit, no foot is formed, only a quantity of water is found condensed on its sides. Even the grosser oils, if slowly burnt with a very small flame, will yield no foot; and an exceeding great quantity of water, fully equal in weight and bulk to the oil employed, may be obtained from them. We can scarcely, however, credit that such a quantity of water comes from the oil; as this would be a real transmutation; and we know, that, besides water, the oils contain also some quantity of fixed air, as well as earth. It is probable, therefore, that, as it is impossible to sustain flame without a decomposition of that part of the air which rushes in to support it, great part of the water in this case comes from the air, which always contains moisture in abundance.

Inflammable matters, on being burnt, generally leave behind a small quantity of earthy matter called *ashes*; but to this, spirit of wine, camphor, the more volatile oils, and the mineral oil called *naphtha*, are exceptions. Vegetable substances when distilled in close vessels give out a quantity of air, some acid, and an empyreumatic oil, leaving behind a black spongy mass called *charcoal*. To this too there are a few exceptions, *viz.* spirit of wine, and the preparations from it, camphor, and perhaps some of the more volatile oils, or naphtha. Animal substances yield only a very fetid empyreumatic oil, and volatile alkali.

In general, all inflammable matters are acted upon with some violence by the vitriolic and nitrous acids, excepting only camphor and naphtha. With the vitriolic acid, when in a liquid state, they render it volatile and sulphureous; if in a dry state, they form actual sulphur. With the nitrous, they first impart a high colour and great degree of volatility to the acid; then a violent flame ensues, if the matter is attempted to be dried. With spirit of wine the effects are considerably different; and very volatile compounds are formed, which are called *ether*, on account of their exceeding great disposition to rise in vapour. Similar compounds are likewise produced, but with more difficulty, from the marine acid and concentrated vinegar. The sal sedativus of borax mixes with spirit of wine, and causes it burn with a green flame; but does not seem to produce any other change upon it. How the acid of tartar, of phosphorus, and of acts, act upon spirit of wine, is not known. With any other inflammable matter, the phosphorine acid reproduces phosphorus.

There are two singularities observed among the inflammable substances. One is that bituminous matter called *amber*, which yields a volatile salt of an acid nature on distillation: When combined with alkalis, this acid is found to yield compounds similar to those made with the acetic acid and alkali. The other is, that gum called *benzoin*, which is used as a perfume, and yields by sublimation, a kind of volatile salt in fine shining crystals like small needles, and of a most grateful odour. These dissolve very readily in spirit of wine; but not at all in water, unless it is made very hot; so that they seem to contain more oily than saline matter.

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Neither

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Neither the nature of these flowers, however, nor that of the salt of amber, is fully known.

SECT. IV. Metalline Substances.

THESE are distinguished from all other bodies by their great specific gravity, exceeding that of the most dense and compact stones. The heaviest of the latter do not exceed the specific gravity of water in a greater proportion than that of 4 to 1; but tin, the lightest of all the metals, exceeds the specific gravity of water in the proportion of 7 to 1. They are also the most opaque of all known bodies, and reflect the rays of light most powerfully.

43
Metals soluble in acids.

Metalline bodies possess the quality of dissolving in and uniting with acid salts, in common with earths and alkalies; but, in general, their union is less perfect, and they are more easily separable. They effervesce with acids, as well as calcareous earths and alkalies; but their effervescence is attended with very different appearances. In the effervescence of acids with alkalies, or with calcareous earths, there is a discharge of the fluid called *fixed air*, which is so far from being inflammable, that it will immediately extinguish a candle, or other small flame immersed in it. The mixture also is notably diminished in weight. When a metalline substance is dissolved in an acid, the weight of the mixture is never very much diminished, and sometimes it is increased. Thus, an ounce of quicksilver being slowly dropped into as much aqua fortis as was sufficient to dissolve it, and the solution managed so as to take up almost a whole day, the whole was found to have gained 7 grains. There is also a remarkable difference between the nature of the vapour discharged from metals, and that from alkalies; the former, in most cases, taking fire and exploding with violence; the latter, as already observed, extinguishing flame.

44
Their composition.

The metalline substances, at least such as we are able to decompose, are all composed of a certain kind of earth, and the inflammable principle called *phlogiston*. The earthy part by itself, in whatever way it is procured, goes by the name of *calx*. The other principle hath never yet been seen by itself. When these two principles are separated from one another, the metal is then said to be *calcined*. The calx being mixed with any inflammable substance, such as powdered charcoal, and urged with a strong fire, melts into metal again; and it is then said to be *reduced*, or *revivified*: and this takes place whether the metal has been reduced to a calx by dissolution in an acid, or by being exposed to a violent fire. If, however, the calcination by fire has been very violent and long continued, the calx will not then so readily unite with the phlogiston of the charcoal, and the reduction will be performed with more difficulty. Whether, by this means, *viz.* a long continued and violent calcination, metalline earths might entirely lose their property of combining with phlogiston, and be changed into those of another kind, deserves well to be inquired into.

46
Calcination and increase of weight by acids.

When a metalline substance is dissolved in any kind of acid, and an alkali or calcareous earth not deprived of its fixed air is added, the alkali will immediately be attracted by the acid, at the same time that the fixed air contained in the alkali is disengaged, and the

calx of the metal, having now no acid to keep it dissolved, immediately joins with the fixed air of the alkali, and falls to the bottom. Something similar to this happens when metals are calcined by fire. In this case, there is a continual decomposition of the air which enters the fire; and the fixed air contained in it, being, by this decomposition, set loose, combines with the calx; whence, in both cases, there is a considerable increase of weight. If the air is excluded from a metal, it cannot be calcined even by the most violent fire.

When a metal is precipitated by a mild alkali, or by an uncalcined calcareous earth⁴⁷ the reason of the increase of weight is very evident; namely, the adhesion of the fixed air to the metalline calx: but, though it is not so much increased when precipitated by caustic alkali, or by quicklime, there is nevertheless a very evident increase, which is not so easily accounted for. M. la Voisier, has mentioned some experiments made on mercury and iron dissolved in aqua fortis, which deserve to be taken notice of, as in a great measure accounting for the phenomenon already mentioned of the solution of metalline substances gaining an addition of weight; and likewise shew the proportion of increase of weight with the mild, or calcined calcareous earth.

“Exactly 12 ounces of quicksilver,” says he, “were put into a matras, and 12 ounces of spirit of nitre⁴⁸ poured on it. Immediately a spontaneous effervescence ensued, attended with heat. The red vapours of the nitrous acid arose from the mixture, and the liquor assumed a greenish colour. I did not wait till the solution was entirely accomplished, before I weighed it; it had lost one drachm, 18 grains. Three hours after, the mercury was nearly all dissolved: but having again weighed the solution, I was much astonished to perceive, that it had increased instead of being diminished in weight; and that the loss, which was one drachm, 18 grains, at first, was now only 54 grains. The next day the solution of the mercury was entirely finished, and the loss of weight reduced to 18 grains; so that in 12 hours the solution, though confined in a narrow necked matras, had acquired an augmentation in weight of one drachm. I added some distilled water to my solution, to prevent it from crystallizing; the total weight of it was then found to be 48 ounces, one drachm, and 18 grains.

“I weighed separately, in two vessels, 8 ounces 15 grains of the above solution, each of which portions, according to the preceding experiment, ought to contain 2 ounces of nitrous acid, and 2 ounces of quicksilver. On the other side, I prepared 6 drachms 36 grains of chalk, and 4 drachms; 26 grains of lime these proportions having been found, by former experiments, just necessary to saturate two ounces of nitrous acid. I put the chalk in the one vessel, and the lime in the other.

“An effervescence attended the precipitation by chalk, but without heat; the mercury precipitated in a light yellow powder; at the same time the chalk was dissolved in the nitrous acid. The precipitation by the lime was effected without effervescence, but with heat; the mercury was precipitated in a brownish powder. When the precipitates were well subsided, I decanted off the liquors from them, and carefully edulcorated

Reason of the increase of weight in metalline calces.

M. la Voisier's experiments.

edulcorated them. After which, I caufed them to be dried in a heat nearly equal to that in which mercury boils.

" The precipitate by the chalk weighed 2 ounces, 2 drachms, 45 grains; that by the lime, weighed 2 ounces, 1 drachm, 45 grains.

" Sixteen ounces of the nitrous acid, the fame as employed in the former experiments, were placed in a matrafs, and fome iron filings gradually added. The effervescence was brisk, attended with great heat, red vapours, and a very rapid difcharge of elastic fluid: the quantity of iron neceffary to attain the point of faturatıon, was two ounces, four drachms; after which, the lofs of weight was found to be 4 drachms, 19 grains. As the folution was turbid, I added as much diftilled water as made the whole weight of the folution to be exactly 6 pounds.

" I took two portions, each weighing 12 ounces of the above folution, and containing 2 ounces of nitrous acid, and 2 drachms 36 grains of iron filings. I placed them in two feparate veffels: to one were added 6 drachms 36 grains of chalk; and to the other, 4 drachms 36 grains of flacked lime, being the quantities neceffary to faturate the acid.

" The precipitation was effected by the chalk with effervescence and tumefaction; that by the lime, without either effervescence or heat. Each precipitate was a yellow brown ruft of iron. They were washed in feveral parcels of diftilled water, and then dried in an heat fomewhat fuperior to that ufed in the laft experiment.

" The precipitate by the chalk, when dried, was a greyish ruft of iron, inclining even to white by veins; it weighed 6 drachms, 35 grains; that by the lime was rather yellower; and weighed 4 drachms, 69 grains.

" The refults of thefe experiments," fays M. la Voifier, " are, 1. That iron and mercury diffolved in the nitrous acid, acquire a remarkable increafe of weight, whether they be precipitated by chalk or by lime. 2. That this increafe is greater in refpect to iron than mercury. 3. That one reafon for thinking that the elastic fluid contributes to this augmentation is, that it is confantly greater when an earth is employed, faturated with elastic fluid, fuch as chalk, than when an earth is ufed which has been deprived of it, as lime. 4. That it is probable that the increafe of weight, which is experienced in the precipitation of lime, although not fo great as that by chalk, proceeds in part from a portion of the elastic fluid which remains united to the lime, and which could not be feparated by the calcination."

But though we are naturally enough inclined to think that the increafe of weight in the precipitates formed by lime proceeded from fome quantity of elastic fluid or fixed air which remained combined with the lime, it is by far too great to be accounted for in this way, even according to the experiments mentioned by M. la Voifier himfelf, and which, from the manner in which they are told, appear to have been performed with the greateft accuracy. He found, that 1 ounce 5 drachms and 36 grains of flacked lime contained 3 drachms and 3 quarters of a grain of water, and only 16 grains and an half of elastic fluid

were feparable from it. In the experiments above related, where only 4 drachms and 36 grains were employed, the quantity of elastic fluid could not exceed 6 or 8 grains. Yet the calx was increafed in mercury, by no lefs than 105 grains; and in iron, by 203 grains; a quantity quite unaccountable from the elastic fluid, or fixed air, which we can fuppofe to be contained in the lime made ufe of.

It is much to be regretted, that the ingenious author of thefe experiments did not make ufe of the calces of metals obtained by lime, when trying to expel air from fuch fubftances by violent heat. This would have been the *experimentum crucis* in this cafe; and could an elastic fluid, fimilar to fixed air, be extracted from a metalline calx, precipitated by a fubftance which could communicate none to it, it would be as ftrong a proof of the *generation* of fuch air, as Dr Priestley's extraction of pure air from metalline calces and fpirit of nitre is a proof of the original production or *generation* of air from thefe fubftances.

That the increafe of weight in metalline calces prepared by fire is owing to an adhefion of air to them, is put beyond a doubt, becaufe that air can be expelled from them. That the increafe of weight in the calces prepared from metals diffolved in acids and precipitated by quicklime is owing to the fame caufe, hath not been proved, becaufe nobody hath tried whether air can be expelled from them or not; at leaft we have not met with an account of any experiments where fuch calces were made ufe of. Hence there is as yet an uncertainty in this fubject; and different theories have been invented to explain it. The moft remarkable is the following.

Metals are found to be compounded of a kind of earth mixed with the inflammable principle or phlogifton. The latter is a fubftance fo volatile, and which fo much eludes our moft accurate fearch, that it is thought to be a principle fomewhat like that known in former ages by the name of *positive levity*. This principle is not only thought to have no tendency towards the earth, or not to be acted upon by the caufe of gravitation, but to have a natural tendency upwards. Hence, in proportion as any body contains more of the phlogifton, and lefs of other principles, it is fo much lighter, by reafon of the tendency of the inflammable principle upwards, which forms fome kind of counterpoife to the action of the caufe of gravity on the other principles. The confequence of this is, that when any fubftance is deprived of its inflammable principle, it ought to be rendered heavier, and actually is fo; (fee FIRE). When a metal, therefore, is deprived of its phlogifton, we ought not to impute the increafe of weight to any thing elfe than the want of the phlogifton, which formerly balanced in fome meafure the action of gravity upon the metalline calx.

In fupport of this theory, the increafe of weight in a metalline folution of quickfilver, for inftance, has been urged: but the experiments adduced in this way are now found to be falacious.

Another argument made ufe of in fupport of this theory is, that metalline calces, though they are increafed in abfolute weight, are neverthelefs very deficient in fpecific gravity. This, however, feems fo far from the purpofe, that it appears to us to prove the direct contrary of

what

49
Consequences from his experiments.

50
Not well founded.

51, [52]
Positive levity of the phlogiston asserted.

THEORY. what is intended. If the phlogiston is a principle of positive levity, and whatever substance contains the largest proportion of it is the lightest; then it follows, that the metalline calces, being deprived of this principle of levity, ought to be specifically *heavier* than after they are combined with it, and assume the metalline form; but as the metals themselves are always found specifically heavier than their calces, we are altogether at a loss for any solid argument in favour of the positive levity of the phlogiston. It is true, if two metals are mixed together, the compound sometimes turns out specifically heavier than either of them taken separately. This no doubt is a curious fact; but is no more extraordinary than that a quantity of salt should dissolve in water without increasing its bulk, (see FLUIDITY), and so render it specifically heavier than before, by more than the difference between the specific gravity of water and of salt. Thus, suppose the specific gravity of salt to water as 2 to 1. A cubic inch of salt then, dissolved in 5 cubic inches of water, ought to increase the bulk to 6 cubic inches, and render the water $\frac{2}{3}$ specifically heavier than before. But if we suppose the quantity of water capable of receiving a cubic inch of salt, without any addition to its bulk, the specific gravity of the fluid will then be increased by $\frac{2}{3}$. In like manner, if a cubic inch of silver, the specific gravity of which is as 11, receives half a cubic inch of mercury, the specific gravity of which is as 14, without increasing its bulk, the specific gravity of the mixture will be as 18; and mixtures of these two metals are found to be of considerably greater specific gravity than either the silver or mercury by themselves.

In this case, however, we mix two gravitating bodies together, and, by something resembling a *penetration of dimensions*, they become specifically heavier; but if we mix a gravitating substance with one which does not gravitate at all, we can never make a compound specifically heavier than before. If, instead of a substance which barely does not gravitate, we take one which is *positively light*, we will be so far from making a compound specifically heavier than the original substance was, that it must necessarily be lighter, let us do as we will. The decrease of specific gravity, therefore, in metalline calces, undeniably proves, that along with the dissipation of the phlogiston, there is something *added*, which, by itself, is specifically lighter than the metal originally was, and to which the decrease of specific gravity in the whole is owing.

Though all metallic bodies, gold, silver, and platinum excepted, are capable of being reduced to a calx by the action of heat alone, yet very different degrees of it are required for calcining them. Lead and tin begin to calcine as soon as they are melted, long before they are made red-hot. The same happens to the femimetals bismuth and zinc; the latter indeed, being combustible, cannot bear a greater heat in open vessels than that which is barely sufficient to melt it. Iron and copper require a red heat to calcine them; though the former may be made partly to calcine by being frequently wetted in a degree of heat considerably below that which is sufficient to make it red.

Most metals undergo a kind of spontaneous calcination in the open air, which is called their *rusting*; and

which has given occasion to various conjectures. But M. la Voisier has shown, that this arises from the fixable part of the atmosphere attaching itself to their earthy part, and discharging the phlogiston. According to him, no metallic body can rust but where there is an absorption of air; and consequently metals can be but imperfectly rusted when kept under a receiver.

If two metals are mixed together, the compound generally turns out more fusible than either of them was before the mixture. There are indeed great differences in the degrees of heat requisite to melt them. Thus, lead and tin melt below that degree of heat which is required to make quicksilver or linseed-oil boil. Silver requires a full red heat, gold a low white heat, copper a full white, and iron an extreme white heat to make it melt. The femimetal called bismuth melts at about 460° of Fahrenheit's thermometer; and tin at about 422°. When mixed in equal quantities, the compound melted at 283°. When the tin was double the bismuth, it required 334° to melt it; with eight times more tin than bismuth, it did not melt under 392°. If to this compound lead is added, which by itself melts in about 540°, the fusibility is surprisingly increased. Mr Homborg proposed for an anatomical injection a compound of lead, tin, and bismuth, in equal parts; which he tells us keeps in fusion with a heat so moderate that it will not singe paper. Sir Isaac Newton contrived a mixture of the above mentioned metallic substances, in such proportions that it melted and kept fluid in a heat still smaller, not much exceeding that of boiling water. A compound of two parts of lead, three parts of tin, and five of bismuth, did but just stiffen at that very heat, and so would have melted with very little more; and when the lead, tin, and bismuth, were to one another in the proportions of 1, 4, and 5, the compound melted in 246°. We have seen, however, a piece of metal compounded of these three, the proportions unknown, which melted, and even underwent a slight degree of calcination, in boiling water, and barely stiffened in a degree of heat so gentle that the hand could almost bear it.

A slight degree of calcination seems to give the acids a greater power over metalline substances; a greater makes them less soluble; and if long and violently calcined, they are not acted upon by acids at all. Of all the acids the marine has the greatest attraction for metallic calces, and volatilizes almost every one of them.

Sulphur readily unites with most metals, destroys their malleability, and even entirely dissolves them. On gold and platinum, however, it has no effect, till united with a fixed alkaline salt, when it forms the compound called *hepar sulphuris*; which is a very powerful solvent, and will make even gold and platinum themselves soluble in water, so as to pass the filter. This preparation is thought to be the means by which Moses dissolved and gave the Israelites to drink the golden calf which they had idolatrously fet up.

When a metal is dissolved in an acid, it may be precipitated, not only by means of calcareous earths and alkalies, but also by some other metals: for acids

53
Metallic compounds sometimes heavier than the heaviest of the ingredients.

56
Fusibility of metallic compounds.

57
Solubility of metals increased by calcination.

58
Effects of sulphure on metals.

54
What metals are calcinable, & with what degrees of heat.

55
Rusting of metals.

THEORY.

do not attract all metals with equal strength; and it is remarkable, that when a metal is precipitated by another, the precipitate is not found in a calcined state, but in a metallic one. The reason of this is, that the precipitating metal attracts the phlogiston which is expelled from that which is dissolving, and immediately unites with it, so as to appear in its proper form. The various degrees of attraction which acids have for the different metals is not as yet fully determined. The best authenticated are mentioned in the Table of Affinities or Elective Attractions, (SECT. VII.)

59
Division into metals and semimetals.

Metalline substances are divided into metals and semimetals. The metals, which are distinguished from the semimetalline substances by their malleability or stretching under the hammer, are in number seven; gold, silver, copper, iron, lead, tin, and platina. To these is added quicksilver; which Mr Brown's experiments have shewn to be a real malleable metal, as well as others, but requiring so little heat to keep it in fusion, that it is always found in a liquid state. The semimetals are bismuth or tin-glass, zinc, regulus of antimony, and cobalt, nickel, and arsenic. This last substance is of a singular nature, and seems to possess a kind of middle nature between the metalline substances and salts. In common with the semimetals, it is capable of being united with the phlogiston in large quantity, when it assumes a splendid metalline form, but wants the ductility of a true metal; so can only be reckoned, even then, among the semimetals. It likewise unites with sulphur, with which it forms a compound of a red or yellow colour, according as more or less sulphur is used. This compound is easily fusible; though the arsenic, by itself, is so volatile as to go off all in vapour rather than melt. In common with the salts, it possesses the properties of dissolving in water, and uniting itself to alkalis. Water will dissolve about $\frac{1}{17}$ of its weight of pure arsenic; but if arsenic is boiled in a strong alkaline lixivium, a much greater proportion will be dissolved. Indeed strong alkaline lixivium will dissolve a part of almost every metalline substance, except gold, silver, and platina; but, excepting copper, which may be formed into crystals by means of the volatile alkali, none of them will assume a crystalline form when united with alkalis. Arsenic, on the contrary, unites very readily with fixed alkalis, and floats with them into a neutral salt. If it is mixed with nitre, it unites itself to the alkaline basis of that salt, and expels the acid in very volatile fumes, which are difficultly condensed into a blue liquor. The reason of this is probably the great attraction between the nitrous acid and phlogiston, which are always disposed to unite when a proper degree of heat is applied. Was the phlogiston contained in large quantity in the arsenic, and the heat sufficiently great, a violent deflagration would ensue; but as the arsenic attracts the alkaline part of the nitre, at the same time that the acid attracts the phlogiston, a double decomposition ensues, in a less degree of heat than would otherwise be necessary; and the nitrous acid arises in a very volatile state, as it always is when combined with phlogiston, which is the occasion of the blueness in aqua fortis so produced. The arsenic is also decomposed in part, by being deprived of its proper quantity of phlogiston;

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in consequence of which it attaches itself so strongly to the fixed alkali of the nitre, that the salt formed by their union cannot be decomposed by the strongest acids. The only method is to prevent to this salt a metallic substance, which the arsenic unites with in preference to the alkali. The common arsenical salts made with arsenic having its due proportion of phlogiston and alkali, may be decomposed by acids. For the extraction of metallic substances from their ores, and the various methods of refining them, see METALLURGY.

SECT. V. Waters.

THE pure element of water, like that of fire, is so much an *agent* in most chemical operations, as to be itself very little the *object* of practical chemistry; no method being hitherto known of compounding or decomposing it. Waters, therefore, can only be the objects of chemistry in consequence of the impurities they contain: and, as these impurities are most commonly of the saline kind, it is impossible that any general theory can be given of waters, distinct from that of the salts contained in them; which all depend on the general properties belonging to salts, and which we have already mentioned. Any thing that can be said with regard to waters, then, must be postponed to the particular consideration of the properties of each of the saline bodies with which water is capable of being adulterated. We shall therefore refer entirely to the article WATER for what can be said on this subject.

61
Water, how far an object of chemistry.

SECT. VI. Animal and Vegetable Substances.

THE general chemical properties of these have been already taken notice of under the name of inflammable substances. They agree in giving out a very thick fœtid oil, when distilled by a strong fire; but in other respects they differ very considerably. Most kinds of vegetables give out an acid along with the oil; but all animal substances (ants, and perhaps some other insects, excepted) yield only a volatile alkali. Some kinds of vegetables, indeed, as mustard, afford a volatile alkali on distillation, similar to that from animal substances; but instances of this kind are very rare, as well as of animals affording an acid. Both animal and vegetable substances are susceptible of a kind of fermentation, called *putrefaction*, by which a volatile alkali is produced in great plenty: there is, however, this remarkable difference between them, that many vegetable substances undergo two kinds of fermentation before they arrive at the putrefactive stage. The first is called the *vinous*, when the ardent spirits are produced, which we have already mentioned when speaking of inflammable substances. This is succeeded by the *acetous*, wherein the vegetable acid called *vinegar* is produced in plenty: and lastly, the putrefactive stage succeeds when a volatile alkali is only produced; not the smallest vestige either of ardent spirits or of vinegar remaining. On the other hand, animal substances seem susceptible only of the putrefactive fermentation; no instance having ever occurred where there was the least drop, either of ardent spirit or of vinegar, produced from a putrified animal substance. (See FERMENTATION AND PUTREFACTATION.)

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Chemical properties.

60
Properties of arsenic.

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63

Invention
of marks
or charac-
ters.

SECT. VII. *Of the Chemical Characters, and
Tables of Elective Attraction.*

THE different marks or characters by which the ancient chemists used to denote many different substances, were invented rather from a superstitious and fantastical principle than from any real necessity; or, perhaps, like the ænigmatical language used by the alchemists, they have thereby sought to conceal their mysteries from the vulgar. In contriving these marks, they affected a great deal of ingenuity; intending them as symbols of the qualities possessed by each of the different substances. A circle being supposed the most perfect figure, was therefore used to represent the most perfect metal in nature, that is, *gold*. Silver being likewise a perfect and indestructible metal, is placed next to gold; but, on account of its inferiority, is expressed only by a crescent, as if but half gold. A circle was likewise used to denote salt of any kind, as being something elaborate and perfect. A cross was used to denote acrimony of any kind, and consequently employed for the acrimonious salts of vitriol, alkali, &c. Hence, all the inferior metals have the cross some-how or other combined with the marks designed to represent them. Thus, the mark for quicksilver denotes, that it hath the splendor of silver, the weight of gold, but its perfection is hindered by an acrimony represented by the cross at bottom, &c. Fire is represented by an equilateral triangle, having one of its angles uppermost. This may be considered as a rude representation of flame, which is always pointed at top. Water, again, is represented by a triangle, with an angle downwards, shewing the way in which that element exerts its strength, &c. All these marks, however, as they were of no real use at first, so they are now becoming every day more and more neglected. Such of them, however, as may most readily occur in chemical books are represented and explained on Plate LXXVI.

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Of tables of
affinities.

Tables of affinities, or elective attractions, are but of late invention. They are consequences of an improved state of chemistry, when the different substances were found to act upon one another in most cases according to a fixed and settled rule. The most approved table of this kind for a long time was that composed by Mr Geoffrey. It was however found to be very incomplete, not only as to its extent, but likewise as heat and some other circumstances were found to vary the attractions considerably, and sometimes even to reverse them. Other tables have been constructed by Mr Gellert, &c. but none hath yet appeared so complete but that many additions may be made to it. The following is that at present exhibited by Dr Black in his course of chemistry:

1. VITRIOLIC ACID.

Phlogiston
Fixed alkali
Calcareous earth
Zinc
Iron
Tin
Copper
Quicksilver
Silver

Volatile alkali
Magnesia
Earth of alum.

2. NITROUS ACID.

Phlogiston
Fixed alkali
Calcareous earth
Zinc
Iron

Lead
Tin
Copper
Quicksilver
Silver
Volatile alkali.

3. MARINE ACID.

Fixed alkali
Calcareous earth
Zinc
Iron
Lead
Tin
Copper
Regulus of antimony
Quicksilver
Silver
Spirit of wine
Volatile oils
Gold.

4. SULPHUR.

Fixed alkali
Calcareous earth
Iron
Nickel
Copper
Lead
Tin
Silver
Regulus of antimony
Quicksilver
Arsenic.

5. HEPAR SULPHURIS is partially decomposed by

Quicksilver
Solution of fixed alkali
Lime-water
Volatile alkali.

6. FIXED AIR.

Calcareous earth
Fixed alkali
Magnesia
Volatile alkali.

7. ALKALINE SALTS.

Vitriolic acid
Nitrous acid
Marine acid
Acetous acid
Volatile vitriolic acid
Sedative salt
Fixed air
Sulphur
Expressed oils.

8. CALCAREOUS EARTH.

Vitriolic acid
Nitrous acid
Marine acid

Acid of tartar
Acetous acid
Sulphureous acid and sedative salt
Sulphur.

9. METALLIC SUBSTANCES, Lead and Regulus of Antimony excepted.

Marine acid
Vitriolic acid
Nitrous acid
Sulphur and acetous acid.

10. LEAD.

Vitriolic acid
Marine acid
Nitrous acid
Acetous acid
Expressed oils.

11. REGULUS OF ANTIMONY.

Vitriolic acid
Nitrous acid
Marine acid
Acetous acid.

12. ARSENIC.

Zinc
Iron
Copper
Tin
Lead
Silver
Gold.

13. REGULUS OF ANTIMONY with Metals.

Iron
Copper
Tin
Lead
Silver
Gold.

14. QUICKSILVER.

Gold
Lead and tin
Copper
Zinc, bismuth, and regulus of antimony.

15. SILVER.

Lead
Copper
Iron.

16. WATER.

Fixed alkali
Spirit of wine
Mild alkaline salts, and some neutrals.

17. SPIRIT OF WINE.

Water
Oils and refins.

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Plate LXXVI
A Table of CHEMICAL CHARACTERS.

Δ Fir.	☉ <i>Regulus of</i>	$\text{c.} \text{O.} \text{A.}$ <i>Cautic vol. Alkali.</i>	O <i>A Powder.</i>
Δ Air.	<i>Antimony.</i>	☿ <i>Potash.</i>	E <i>Ashes.</i>
∇ Water.	$\text{O} \text{O}$ <i>Arsenic.</i>	$\text{H} \text{---} \text{---} \text{---}$ <i>Acids.</i>	B <i>ABath.</i>
∇ Earth.	$\text{O} \text{O}$ <i>Regulus of Arsenic.</i>	+ <i>Vinegar.</i>	BM; MB; <i>Water bath.</i>
$\text{f} \Delta$ Fixable Air.	K <i>Cobalt.</i>	$\text{O} \text{+}; \text{O}$ <i>Nitric Acid.</i>	AB <i>Sand bath.</i>
$\text{m.} \Delta$ Mephitic Air.	N <i>Nickel.</i>	$\text{O} \text{+}; \text{O}$ <i>Vitreous Acid.</i>	VB <i>Vapor bath.</i>
∇ (lay).	S.M. <i>Metallic Substances.</i>	$\text{O} \text{+}; \text{O}$ <i>Marine Acid.</i>	X <i>An Hour.</i>
∇ Gypsum.	C <i>Calc.</i>	F.E. <i>Aqua fortis.</i>	O <i>1 Day.</i>
∇ ; ∇ ; ∇ <i>Calcareous Earth.</i>	$\text{O} \text{O}$ <i>Orpiment.</i>	R.R. <i>Aqua Regia.</i>	Q <i>1 Night.</i>
∇ CV; ∇ <i>Quicklime.</i>	S <i>Cinnabar.</i>	Δ <i>Vol. Sulphureous Acid.</i>	X <i>1 Month.</i>
∇ <i>Vitrifiable, or</i>	L.C. <i>Lapis Calaminaris.</i>	Δ <i>Phosphoric Acid.</i>	$\text{aaa; } \Delta$ <i>Amalgam.</i>
<i>Siliceous Earths.</i>	O <i>Sully:</i>	V <i>Wine.</i>	$\text{O}; \text{S};$ <i>To Distill.</i>
∇ <i>Fluors, or</i>	O <i>Vitriol.</i>	V^{st} <i>Spirit of Wine.</i>	--- <i>To Sublime.</i>
<i>Fusible Earths.</i>	$\text{O}; \text{O};$ <i>Sea Salt.</i>	R <i>Rectified V.</i>	--- <i>To Precipitate.</i>
X <i>Talk.</i>	$\text{S}; \text{O};$ <i>Sal Gem.</i>	E <i>Ether.</i>	--- <i>A Retort.</i>
$\text{M} \nabla$ <i>Magnesia.</i>	O <i>Vitre.</i>	∇ <i>Lime Water.</i>	XX <i>An Alembic.</i>
$\text{A} \nabla$; O <i>Earth of Alum.</i>	$\text{O}; \text{O};$ <i>Borax.</i>	O <i>Urine.</i>	$\text{+}; \text{+}^{\text{ble}}$ <i>A Crucible.</i>
--- <i>Sand.</i>	S.S. <i>Sedative Salt.</i>	$\text{O}; \text{O}; \text{O}; \text{O};$ <i>Oil.</i>	SSS <i>Stratum Super-</i>
O <i>Gold.</i>	X.O.X. <i>Sal Ammoniac.</i>	$\Delta \text{E. O.}$ <i>Essential Oil.</i>	<i>Stratum.</i>
$\text{O}; \Delta$ <i>Silver.</i>	O.O. <i>Alum.</i>	∇ <i>Fixed Oil.</i>	C.C. <i>Cornu Cervi</i>
O <i>Copper.</i>	O <i>Tartar.</i>	Δ <i>Sulphur.</i>	<i>Hartshorn.</i>
Z <i>Tin.</i>	$\text{S}; \text{S.}$ <i>Alkali.</i>	$\text{O} \text{+}$ <i>Hepar of Sulphur.</i>	--- <i>ABottle.</i>
H <i>Lead.</i>	$\text{O} \text{+}; \text{O} \text{+};$ <i>Fixed Alkali.</i>	Δ <i>Phosphorus.</i>	gr. <i>1 A Grain.</i>
O <i>Mercury.</i>	$\text{O} \text{+}; \text{O} \text{+};$ <i>Volatile Alkali.</i>	O <i>Phlogiston.</i>	Di. <i>A Scruple.</i>
O <i>Iron.</i>	$\text{m.} \text{O} \text{+}$ <i>Mild fixed Alkali.</i>	O <i>Soap.</i>	Zi. <i>A Dram.</i>
Z <i>Zinc.</i>	$\text{c.} \text{O} \text{+}$ <i>Cautic fixed Alkali.</i>	O <i>Verdigrise.</i>	Zi. <i>An Ounce.</i>
B.W. <i>Bismuth.</i>	$\text{m.} \text{O} \text{+}$ <i>Mild vol. Alkali.</i>	$\text{O} \text{O}$ <i>Glass.</i>	lb. <i>A Pound.</i>
O <i>Antimony.</i>		O <i>Caput Mortuum.</i>	dw. <i>A Penny weight.</i>

THEORY.

THEORY.

In consequence of heat, sedative salt decomposes vitriolated tartar and sea-salt.—Phosphoric acid decomposes vitriolated tartar, nitre, and sea-salt.

Double Elective Attractions; which, in some cases, may be considered as exceptions to the foregoing table.

I. Those which happen in mixtures of watery substances.	
1. { Acids	Volatile alkali
{ Calc. earths, or metallic substances	Fixed air.
2. { Vitriolic or marine acids	Mercury, silver, or lead
{ Alkalies or earths	Nitrous or acetous acids.
3. { Lead	Vitriol acid
{ Nitrous, marine, or acetous acids	Alkalies, earths, or M. S.
4. { Silver	Marine acid
{ Vitriolic, nitrous, or acetous acids	Alkaline salts, earths, or M. S.
5. { Volatile alkali	Fixed air
{ Acids	Fixed alkali.
6. { Nitrous, marine, or acetous acids	Volatile alkali, magnesia, or earth of alum
{ Calcareous earths	Vitriolic acid.

II. Those which happen in distillations or sublimations, and require heat.

1. { Vol. alkali	Fixed air
{ Acids	Calcareous earths.
2. { Vol. alkali	Nitrous, marine, or acetous acids
{ Vitriol. acid	Fixed alkali.
3. { Vol. alkali	Acetous acid
{ Nitrous, marine, or vitriolic acids	Fixed alkali, or absorbent earths.
4. { Reg. of antimon.	Marine acid
{ Sulphur	Quicksilver.

III. Those which happen in mixtures by fusion.

1. { Tin	Iron
{ Silver	Lead.
2. { Copper	Sulphur
{ Gold	Lead.
3. { M. S.	Sulphur
{ Gold	Reg. of ant.

The first of these tables requires very little explanation. The names printed in small capitals, are those of the substances which have the affinity with or attract those below them. Thus, vitriolic acid attracts most powerfully the phlogiston, or inflammable principle; next, fixed alkali; then, calcareous earth; and so on, in the order in which they are marked.—The tables of double elective attractions cannot be made quite so distinct; though an explanation of one example will make this likewise easy to be understood. Thus in Table I. the first case is, “If a combination of acids with calcareous earths or metallic substances is mixed with a combination of volatile alkali and fixed

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air, the acids will unite themselves to the volatile alkali, and the fixed air to the calcareous earth or metallic substance.

SECT. VIII. *Of the different Operations in Practical Chemistry, and the proper Instruments for performing each.*

THE most remarkable operations in chemistry, and by which the greatest changes are made upon those bodies which are the objects of that science, may be comprehended under the following names. 1. Solution. 2. Filtration. 3. Precipitation, or coagulation. 4. Evaporation. 5. Crystallization. 6. Distillation. 7. Sublimation. 8. Dettiguration. 9. Calcination. 10. Fusion. 11. Maceration, or digestion. To which we may add, 12. Trituration, or levigation.

Before we proceed to a particular account of each of these operations, it is necessary to take notice, that there are two different things proposed by those who enter on the practice of chemistry. Some have nothing farther in view than the enlargement of their knowledge, or making improvements in arts which are to be practised by others for their own advantage. Others design to follow chemistry as a trade, by which they hope to enrich themselves, or to get a comfortable livelihood. But the apparatus and utensils necessary for performing the very same operations are exceedingly different when experiments only are to be made, from what they must be when these operations are performed with a view to profit; and so great is this difference, that those who pursue chemistry with a view to advantage, will always find themselves very considerable losers if they follow the plan of an apparatus or a laboratory designed only for making experiments. Along with the apparatus, therefore, which is commonly described in chemical books, and proper only for experiments, we shall also give that which is necessary for preparing great quantities of any chemical article in the way of trade.

In general, those who practise chemistry merely with an experimental view, ought, as much as possible, to make use of glass vessels, as not being liable to be corroded by the most powerful solvents; and, by their transparency, giving an opportunity of observing what passes within them during the operation. But, by those who practise chemistry with a different view, these vessels ought, with equal care, to be avoided, on account of their expence, and brittleness. This last quality, indeed, is possessed by glass in so eminent a degree, that glass vessels will sometimes fly to pieces, and that with considerable violence, when standing by themselves, and nothing touching them. The principal objects which a chemist ought to have in view, in performing his operations, ought to be to save time and fuel, especially the first; and for this purpose, he would find himself a considerable gainer, though he should be at much greater expence in his apparatus than he would otherwise have occasion for.

We shall now proceed to a particular description of each of the operations above mentioned; and first of

SOLUTION. By this is understood the dissolving a solid substance in a fluid, so as that the solid shall totally disappear, and become part of a transparent liquor.

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Operations in chemistry, may be dry.

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Chemists, how divided.

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Glass vessels, when to be used.

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Solution.

THEORY.

This operation applies particularly to salts, earths, and metals; as well as to several unctuous and inflammable substances. For performing this operation in a small way, common vials are in many cases sufficient. Where the solution is attended with effervescence and a discharge of vapours, the long-necked glasses called *matrasses*, or *bell-heads*, (fig. 5.), are necessary. Florence flasks are indeed exceedingly well adapted for this operation, as being of the proper shape, and capable of bearing heat so well, that they may be filled with any fluid, and set on a common fire like a metalline vessel. Solution is much promoted by agitating the vessel, and by heat. In some cases, indeed, it will not take place till the mixture becomes very hot; and in such cases it will be proper to make the fluid boiling hot by itself, and then slowly to add the substance to be dissolved.

Plate
LXXXVII.

When large quantities of saline matter are to be dissolved, metalline vessels must be used: but before any are made use of for this purpose, it will be necessary to make an experiment whether the salt receives any impregnation from the metal of which the vessel intended to be made use of is formed; and if this is found to be the case, it must not be used. The metals most liable to be corroded by saline bodies, are iron and copper; and indeed, unless it be for the single purpose of dissolving fixed alkaline salts, iron vessels seem totally unfit for saline solutions of any kind. Copper vessels are also very liable to be corroded, and to communicate very mischievous qualities to the liquors which corrode them; for which reason, they ought never to be made use of for the purposes of solution. The metal least liable to be corroded, next to gold and silver, is lead; and therefore a chemist ought rather to provide himself with leaden vessels than those of any other metal. But though lead is not apt to be corroded by many kinds of salts, there are some which are found to act upon it, and to form therewith a very dangerous poison. The vegetable acid of vinegar is particularly apt to receive a dangerous impregnation from this metal, and therefore no solution of any salt containing this acid ought to be made in leaden vessels. It appears to be very little affected by the vitriolic or marine acids, and therefore any saline substance containing either of these acids may be safely enough dissolved in vessels made of lead.

In order to save time in making solutions, the vessels ought to be as large as possible; though even in this there must be a certain limit: for two small vessels filled with water will sooner acquire the necessary degree of heat than one large one; and in proportion as the vessel is made more capacious, the sides and bottom must be thicker, which considerably increases the expence. Fifteen or twenty English gallons is the utmost capacity of which they ever will be required; and is rather above what will on most occasions be necessary. They ought to be of a conical figure, round at the bottom; and to have a cover of thick plate-iron all around that part which is exposed to the action of the fire, that the lead may not bend on the application of heat, which it would otherwise be very apt to do. When the solution is to be made, the leaden vessel is first to be filled up with water so far as to have room for the quantity of salt intended to be dissolved:

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a fire is then to be applied so as to make it boil: and then the salt is to be added slowly, so as scarcely to hinder the boiling; for if a great quantity was thrown in at once, so as to cool the liquor very much, great part of the salt would concrete on the bottom, in such a manner as not only to be very difficultly soluble, but even to endanger the melting of the vessel. It is of some consequence also to avoid the hot steam which proceeds from the boiling water, and which issues with great force from a narrow-mouthed vessel such as we have been decribing. That the operator may be out of the reach of this, and likewise dissolve the salt in a regular and gradual manner, without any danger of its concreting on the bottom, it will be proper to have a leaden, or even a wooden, vessel, with a long handle; which is to be filled with the substance to be dissolved, then immersed in the boiling liquor, and shaken about in it, till the salt is made into a kind of thick pap, which will be in no danger of concreting. It will also be proper not to saturate the water perfectly with salt; for it will in that case be impossible to hinder part of it from settling on the bottom, where it soon acquires such a degree of heat as to melt the lead. Before any saline substance is put into water for solution, it ought to be pounded and sifted through a hair sieve.

Where large quantities of metal are to be dissolved in acids, especially the nitrous acid, glass vessels are in a manner indispensable; although the common stone-ware bottles, especially those made in Holland, will answer the purpose very well, as not being liable to corrosion, and not so apt to break as the glass vessels are. They may be got of such a size as to hold 3 or 4 gallons: but no vessel in which metalline solutions are made, ought ever to be above half full.

In solutions of oily and inflammable substances, cast iron vessels are perhaps the most proper of any; tho' copper ones are generally preferred. The copper is excessively soluble in oil, especially if it is left to cool in such a vessel; but iron is not soluble in any inflammable matter except sulphur. Copper has however this advantage over iron, that it is sooner cooled, as the vessels made of copper are thinner than they can be made of cast iron: so that if too great heat is applied to a copper vessel, it may be easily remedied by taking it off the fire; but in a cast iron vessel the heat continues so long as may sometimes produce dangerous consequences, even after the fire is removed.

2. FILTRATION. This operation is generally the attendant of solution: very few substances, of the saline kind especially, are capable of being dissolved without leaving some impurities, from which they must be freed; and the doing of this, so as to render the solution perfectly transparent, is what is understood by the word *filtration*.

For purposes merely experimental, a glass funnel and piece of paper are generally sufficient. The paper is formed into a conical cap, which being placed in the funnel with its point downwards, the funnel is then placed in the mouth of a vial; and the solution or other liquor to be filtered is poured into the paper cap, through which the liquor passes transparent, leaving its impurities on the paper. For the purpose of filtration, paper has come into such general use, that a particular

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Filtration.

kind

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THEORY.

kind of it is prepared under the name of *filtering paper*. This is of a reddish colour; but Dr Lewis prefers the whitish grey paper which comes from Holland about the pill boxes, as not giving any colour to the solutions which pass through it.

This operation, though apparently so simple and easy, is nevertheless attended with very troublesome circumstances, on account of the great time it takes up. Even where very small quantities of liquor are to be filtered, merely for experiment's sake, the impurities frequently settle on the paper so soon, and obstruct its pores to such a degree, that the operator is often quite wearied out; often, too, the paper breaks; and thus the whole is spoiled, and the operation must be begun over again.

To avoid these inconveniencies, another method of filtration hath been proposed; namely to use a number of cotton threads, the ends of which are to be immersed in the liquor, and the other ends are to hang over the side of the vessel which contains it, and to hang lower than the surface of the liquor. By this means they will act as so many capillary syphons, (see *SYPHON*); the liquid will arise in them quite pure, and be discharged from their lower extremities into a vessel placed to receive it. That the liquor may flow freely into the cotton, it will be proper to wet the threads before they are used.

In point of efficacy, no doubt, this method excels every other; and where the operator has abundance of time and patience, may be proper for experiments; but, in the way of trade, such a contrivance is evidently useless. For filtering large quantities of liquor, therefore, recourse has been had to large funnels; earthen cullenders, or basins full of holes in the bottom, lined with filtering paper; and to conical bags of flannel or canvas.

The inconveniences attending funnels, when used only in the way of experiment, are much greater when they are employed for filtering large quantities of liquor; and therefore they are generally laid aside. The earthen cullenders, too, do not answer any good purpose; nor indeed does filtration through paper in general succeed well. The conical flannel or canvas bags are greatly preferable; but they have this inconvenience, that the pressure of the liquor is directed chiefly against one particular point, or a small part of the bottom, and therefore the impurities are forcibly driven into that place; and thus the operation becomes insufferably tedious.

The best method of obviating the inconveniences of filtration seems to be the following. Let a wooden frame of about three feet square be made, having four holes, one in each corner, about three quarters of an inch in diameter. This frame is to be supported by four feet, the ends of which must project an inch or two through the holes. Thus the whole may be occasionally let up and taken down, so as to go into very little compass; for if the feet are properly placed, each with a little projection outwards, there will be no danger of its falling. A square piece of canvas must also be procured, somewhat less than the wooden frame. On each corner of it there must be a very strong loop, which slips on one of the projecting ends of the feet, so that the canvas may hang a

little slack in the middle of the frame. The liquor to be filtered is now poured into the canvas, and a vessel placed underneath to receive it. At first it will pass through very foul; but, being returned two or three times, will become perfectly transparent, and will continue to run with great velocity, if the filter is kept constantly full. A filter of the size just now mentioned will contain ten gallons of liquid; which is a very great advantage, as the heat of such a quantity of liquor is not soon dissipated, and every solution filters much faster when hot than when allowed to cool.

The advantages of a filter of this kind above others arise from the pressure of the liquor being more equally diffused over a large space, by which the impurities are not forced so strongly into the cloth as to stop it up entirely. Yet even here, where large quantities of liquor require filtration, the cloth is apt to be stopped up so as to make the operation not a little tedious and disagreeable. It will be proper therefore to have several cloths, that one may be applied as soon as another is taken off.

To promote the operation of filtration, it is very proper to let the liquors to be filtrated settle for some time; that so their grosser feculencies may fall to the bottom, and thus there will be the fewer to retard the last part of the operation. Sometimes, however, these feculencies refuse to settle till after a very long time; and where this happens to be the case, a little powdered quicklime thrown into the boiling liquor remarkably promotes the separation. This, however, can only be used in certain cases.

In some cases, the discovery of a ready way of filtering a large quantity of liquor would be a matter of great consequence; as where a town is supplied with river-water, which is generally far from being clear, and often imparts a disagreeable colour to clothes washed with it. Some years ago, a scheme was proposed by a chemist for filtering muddy water in any quantity. His method was, to have a large cask covered over in the bottom with straw to the depth of some inches, and then filled up with sand. This cask was entirely open at one end, and had a hole in the other, which, by a means of a leaden pipe, communicated with a large reservoir of the water to be filtered, and which stood considerably higher than the cask. The water which descended through the pipe into the cask, having a tendency to rise up to the same level with that in the reservoir, would press violently against the sand, and, as he thought, run over the mouth of the cask perfectly filtrated, and free from its impurities. By this contrivance, indeed, a very violent pressure was occasioned, if the height of the reservoir was considerable; but the consequence was, not a filtration, but a greater of impurity in the water; for the sand was forced out of the cask along with it, and, however confined, the water always rose as muddy as it went in.

Where water is to be filtered in large quantity, as for the purposes of a family, a particular kind of soft spongy stones, called *filtering stones*, are employed. These, however, though the water percolates through them very fine, and in sufficient quantity at first, are liable to be obstructed in the same manner as paper,

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THEORY.

and are then rendered useless. A better method seems to be, to have a wooden vessel, lined with lead, three or four feet wide at top, but tapering so as to end in a small orifice at the bottom. The under part of the vessel is to be filled with very rough sand, or gravel, well freed from earth by washing. Over this, pretty fine sand may be laid to the depth of 12 or 14 inches, but which must likewise be well freed from earthy particles. The vessel may then be filled up to the top with water, pouring it gently at first, lest the sand should be too much displaced. It will soon filter thro' the sand, and run out at the lower orifice exceedingly transparent, and likewise in very considerable quantity. When the upper part of the sand begins to be stopped up, so as not to allow a free passage to the water, it may occasionally be taken off, and the earthy matter washed from it, when it will be equally serviceable as before.

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Precipitation.

3. PRECIPITATION, or COAGULATION. This operation is the reverse of solution, and is the bringing a body suddenly from a fluid to a solid state. It differs from crystallization, in that it generally requires less time, and in crystallization the substance assumes regular figures, whereas precipitates are always in the form of powders.

Precipitation is generally preceded by solution and filtration: it is used for separating earths and metals from the acids which had kept them suspended. When a precipitation is made of the more valuable metals, glass vessels are to be used. When earths, or the imperfect metallic substances, are to be precipitated in large quantity, wooden ones answer every purpose. If a metal is to be precipitated by an alkali, this salt must first be dissolved in water, then filtered, and gradually added to the metallic solution. If particular circumstances do not forbid, the salt for precipitation should be chosen in its caustic state, or deprived of its fixed air, because then a very troublesome effervescence is avoided. To promote the operation also, the mixture, if contained in a glass, is to be shaken; or if in any other vessels, to be well stirred after every addition of alkali. If an earth is employed to precipitate a metal, the mixture must be in a manner constantly stirred or shaken, in order to promote the precipitation; and if one metal is to be precipitated by another, that which is used as a precipitant must be beaten into thin plates, that so they may be frequently cleaned from the precipitating metal, which would otherwise very soon totally impede the operation.

Sometimes a precipitation ensues on the addition of water, or spirit of wine: but, in most cases, care must be taken not to add too much of the substance which is used to precipitate the other; because, in such a case, the precipitate may be dissolved after it has been thrown down. Thus, though volatile alkali will separate copper from aqua fortis, it will as effectually dissolve the precipitate if too much of it is used, as the acid itself. It is proper, therefore, to proceed cautiously, and examine a small quantity of the liquor from time to time. If an addition of the precipitant throws down any more, it will be proper to add some more to the whole solution.

It is seldom or never that precipitation can be performed so perfectly, but that one or other of the in-

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Educalcation.

redients will prevail; and though they should not, a new compound, consisting of the acid united with the alkali, or other substance used for precipitation, is contained in the liquor through which the precipitate falls. It is proper, therefore, to wash all precipitates; otherwise they can never be obtained perfectly pure, or free from a mixture of saline substances. This is best done by pouring the whole into a filter, and letting the fluid part run off, as long as it will drop, without shaking the cloth. Some water is then to be cautiously poured all over the surface of the precipitate, so as to disturb it as little as possible. This water will push before it the saline liquor which is mixed with the powder, and render it much purer than before. A second, or third quantity of water may be used, in order to wash off all the saline matter. This is called *edulcorating* the precipitate.

4. EVAPORATION. This operation consists in dissipating the moist fluid or volatile parts of any substance by means of heat. It most generally succeeds solution and filtration, being a preparatory for the operation of crystallization.

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Evaporation.

For the evaporation of saline solutions, which have been already filtered, and which it is of consequence to preserve from even the least impurities, distilling vessels are unquestionably the most proper; both as, by their means, the solution will be kept perfectly free from dust, and as the quantity of liquor evaporated can be known with certainty by measuring that which comes over. This also is probably the most expeditious method of evaporating, and which requires the least fuel. (See the detached articles EVAPORATION and DISTILLATION). With regard to vessels for evaporation, the same thing must be applicable which was mentioned above under *Solution*. No saline liquor must be evaporated in a vessel which would be corroded by it; and hence iron vessels are absolutely improper for evaporations of any kind of saline liquor whatever.—Lead is in this case the metal most generally useful. It must only be used, however, where the evaporation is not carried to dryness; for, on account of the great fusibility of this metal, nothing could be excruciated in it without great danger of its melting. Where a saline liquor therefore is to be perfectly excruciated, the evaporation, if performed in lead vessels, must be carried on so far only as to form a saline pellicle on the surface of the liquor. It is then to be drawn off; for which purpose, all evaporating vessels should have a cock near the bottom. The liquor must now be put into a number of stone-ware basons, set on warm sand, where the excruciation may be finished.

5. CRYSTALLIZATION. This, though commonly accounted one of the processes in chemistry, is in reality only a *natural* one, and which the chemist can only prepare for, leaving the operation entirely in the hands of nature.—By crystallization is meant the separation of a salt from the water in which it has been dissolved, in transparent masses regularly figured, and differently formed, according to the different nature of the salts.

This process depends upon the constitution of the atmosphere more than any other; and therefore is difficult to be performed, nor does it always succeed equally well; neither have there yet been laid down

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Crystallization.

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any rules whereby beautiful and regular crystals can with certainty be formed at all times.

As the different facts affume very different figures when crystallized, they are not subject to the same general rules in crystallization. Nitre, Glauber's salt, vitriol of iron, and many others, crystallize best on having their solutions set in a cold place after proper evaporation. Sal polychrest, and common salt, require the solution to be kept as hot as the hand can bear it during the time of crystallizing. Soluble tartar too, and other deliquescent salts, require to be kept warm while this operation is going on; and there are many saline substances, such as the combinations of calcareous earths and magnesia with acids, which can scarcely be crystallized at all.

Mr Beaumé has discovered, that when two or more salts are dissolved in the same quantity of water, when one crystallizes, the crystals of that salt will not contain the least quantity of any of the others; neither, although the liquor was acid or alkaline, will the crystals for that reason be either acid or alkaline, but will remain perfectly neutral; and the acid or alkaline liquor which adheres to the outside of the crystals may be absorbed by merely spreading them on filtering paper.—Hence we are furnished with a better method of shooting salts into large and well formed crystals than merely by dissolving them in water; namely, by adding to the solutions when set to crystallize, a certain quantity of acid or alkaline liquor, according to the nature of the salts themselves. These additions, however, are not equally proper for all salts; and it is not yet determined what kinds of salts ought to be crystallized in alkaline, and what in acid, liquors.—Soluble tartar and Seignette's salt crystallize best when the liquor is alkaline. Sal sedativus, sal Glauberi, and sal polychrest, require an acid if crystallized in the cold; but sal polychrest forms into very fine and large crystals when the solution is alkaline, and kept as hot as the hand can easily bear.

The best general direction that can be given with regard to the regular crystallization of salts is, that they ought to be set to crystallize in as large a quantity at once as possible; and this, as far as we have observed, without any limit; for by this means, the crystals are formed much larger and better figured than they possibly can be by any other method hitherto known.—As to the form of the vessels in which salts are to be crystallized, little can be said with certainty. They are generally flat, and wider at top than at the bottom. The only proper material, in the large way, is lead.

6. DISTILLATION. This is a kind of evaporation; only in such a manner, that the part of the liquor evaporated is not dissipated in the air, but preserved, by making the steam pass through a spiral pipe, which goes through a large vessel full of cold water, or into cold glass receivers.

This is one of the most common chemical operations; and as there are a variety of subjects which require to be distilled, there is consequently a considerable variety both in the form of the distilling vessels to be used on different occasions, and likewise in the materials of which they are made, as well as the management of the fire during the time of the operation.

The most simple and easily performed distillation is that by the common copper still, (fig. 3). It consists of two parts; one called the *body*, and the other the *head*. The body is a cylindrical vessel of copper, which is sometimes tinned over in the inside; but where distillation is performed without any regard to the residuum, the tinning is useless. The upper part of the body terminates in a kind of arch, in the middle of which is a circular aperture, about one half, or something less, in diameter, of the breadth of the whole body.—Into this aperture, a round head, made likewise of copper, is fitted, so as to be removable at pleasure. In the top, or sometimes in the side of the head, is inserted a pewter pipe, which communicates with a spiral one of the same metal, that passes through a large wooden vessel, called the *refrigeratory*, filled with cold water; each of its ends projecting a little above and below. The still is to be filled two thirds full of the substance to be distilled, the head put on, and the junctures well closed with a mixture of lintseed meal and water, or common flour or chalk and water will answer the same purpose. This mixture is called the *lutings*, or *lute*. A fire being kindled under the still, the vapours will arise; and, being condensed by the cold water through which the spiral pipe called the *worm* passes, will run in a stream more or less strong as the fire is more or less hastily urged, and is caught in a receiver set underneath.

This kind of distilling vessels is proper for procuring the essential oils of vegetables, vinous spirits from fermented liquors, and for the rectification of these after they are once distilled. Even the acetous acid may be very conveniently distilled in a copper vessel, provided the worm and all the descending parts of the pipe which communicates with it be of pewter, otherwise a mischievous impregnation of copper would be communicated to the distilled vinegar. The reason of this is, that copper is not dissolved by vinegar, or in very small quantity, when that acid is boiled in it; but if the metal is exposed to the action of the acid when cold, or to its vapours, a considerable dissolution takes place. For this reason, too, the still must be washed out after the operation while it continues hot, and must be very carefully freed from the least remains of acid, otherwise it will be much corroded.

Copper-stills ought to be of as large a size as possible: but Dr Lewis very justly observes, that, in common ones, the width of the worm is by no means proportionable to the capacity of the still; hence the vapour which issues from a large surface being violently forced through a small tube, meets with so much resistance as sometimes to blow off the still-head. This inconvenience is ridiculously endeavoured to be prevented by strongly tying or otherwise forcing down the head; by which means, if the worm should happen to be choked up, a terrible explosion would ensue: for no ligatures, or any other obstacle whatever, have yet been found strong enough to resist the elastic force of steam; and the greater obstacle it has to overcome, the greater would the explosion be.—Dangers of this kind might be totally avoided by having the worm of a proper degree of wideness.

Sometimes, however, matters are to be distilled, as such as mineral acid spirits, which would corrode any kind of vessel.

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Retort.

kind of metalline vessels; and for these only earth, or the closest kind of stone-ware, can be used. These are more easily condensed than the steams of aqueous or vinous liquors, and therefore do not require to be passed through a pipe of such a length as is used for condensing the steams from the common still. In these cases, where a violent heat is not necessary, and the distillation is to be performed in glass vessels, the retort is used (fig. 4.) When a fluid is to be put into this vessel, the retort must be laid upon its back on sand, or any other soft matter that will support it without breaking. A funnel must also be procured with a long stem, and a little crooked at the extremity, that the liquor may pass at once into the belly of the retort, without touching any part of its neck; otherwise the quantity which adhered to the neck would pass into the receiver when the retort was placed in a proper situation for distilling, and foul the produce. When the vessel is properly filled, which ought never to be above two thirds, it is to be set in a sand bath; that is, in an iron pot, of a proper thickness, and covered over in the bottom, to the depth of one or two inches, with dry sand. When the retort is put in, so as to stand on its bottom, the pot is to be filled up with sand, as far as the neck of the retort. A glass receiver is then to be applied, which ought to be as large as possible, and likewise pretty strong, for which reason it will be proper not to let the capacity of it be above what is necessary to hold ten gallons. In the hinder part of it should be drilled a small hole, which may be occasionally shut by a small wooden peg. The mouth of the receiver ought to be so wide as to let the nose of the retort enter to the middle of it, or very near it; for if the vapours are discharged very near the luting, they will act upon it much more strongly than when at a distance. It is likewise proper to have the neck of the retort as wide as may be; for this has a very great effect in the condensation, by presenting a larger surface to the condensing vapour.

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Luting for acid spirits.

The luting for acid spirits ought to be very different from that used in other distillations; for these will penetrate the common lutes so as to make them liquid and fall down into the receiver. Some have used retorts, the necks of which were ground to the receivers with emery; but these are very difficult to be procured, and are expensive, and consequently have never come into general use. Various kinds of lutes have been proposed, but the preference seems due to a mixture of clay and sand. We are not to understand, however, that every kind of clay is fit for this purpose: it must only be such as is not at all, or very little, affected by acids; and this quality is only possessed by that kind of which tobacco-pipes is made. Trial ought to be made of this before the distillation is begun, by pouring a little nitrous acid on the clay intended to be made use of. If a violent effervescence is raised, we may be sure that the clay is unfit for the purpose. Finely powdered alabaster would answer extremely well, had it the ductility of clay. As this kind of lute remains soft for a considerable time, it ought to be farther secured by a bit of rag spread with some strong cement, such as quicklime mixed with the white of an egg, &c. Matters, however, ought

to be managed in such a manner, that the luting may give way, rather than the vessels burst; which would not only occasion a certain loss of the materials, but might endanger the persons who were standing by.

The iron pots commonly used for distillations by the sand-bath, or *balneum arenae*, are commonly made very thick; and are to be sold at large foundries, under the name of *sand-pots*. The shape of these, however, is by no means eligible: for, as they are of a figure nearly cylindrical, if the retort is of such a size as almost to fill their cavity, it cannot be put into them when full, and often pretty heavy, without great danger of touching the sides of the pot; and in this case, touching and breaking are synonymous expressions. It is much better, therefore, to have them in the figure of a punch-bowl; and the common cast-iron kettles, which may be had much cheaper than the sand-pots usually sold, answer extremely well. If the distilling vessel is placed in a pot filled with water, the distillation is said to be performed in a water-bath, or *balneum marie*.

When the matter to be condensed is very volatile, a number of open receivers with two necks, called *adopters*, (fig. 7.) may be used, with a close receiver at the end. Each of these adopters must be luted with as much care as when only a single receiver is made use of. Vessels of a similar kind were formerly much used by chemists for particular sublimations, under the name of *aludels*.

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Adopters or aludels.

Formerly, instead of retorts, a vessel called a *cucurbit*, (fig. 5, and 6.) with a head like the common still, called an *alembic*, were used; but the more simple figure of the retort gives it greatly the preference. It is but seldom that vessels of this kind are useful, which will be taken notice of when describing the particular operations; and if at any time an alembic head should be necessary, its use may be superseded by a crooked glass tube, which will answer the purpose equally well.

Sometimes a very violent fire is required in distillations by the retort. Here, where it is possible, glass or earthen vessels should be avoided, and iron pots substituted in their stead. The hardest and best cast iron, however, will at last melt by a vehement heat; and therefore there is a necessity for using earthen ware, or coated glass. This last is better than most kinds of earthen ware, as being less porous; for when the vessel is urged by a very intense heat, the glass melts, and forms a kind of semivitreous compound with the inside of the coating, so that its figure is still preserved, and the accidental cracks in the luting are filled up.

For coating of glasses, mixtures of colcothar of vitriol, sand, iron filings, blood, chopped hair, &c. have been recommended. We cannot help thinking, however, that the simple mixture of tobacco-pipe clay and sand is preferable to any other; especially if, as Dr Black directs, that part next the glass is mixed with charcoal dust.

The proportions recommended by the Doctor for luting the joints of vessels, are, four parts of sand, and one of clay; but, for lining the insides of furnaces, and, we should think, likewise for coating glass vessels, he directs 6 or 7 of sand to 1 of clay; that the contraction

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Coating of glasses.

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tion of the clay in drying may thereby be the more effectually prevented. Besides this, he directs a mixture of three parts of charcoal-dust with one of clay, to be put next the furnace itself, as being more apt to confine the heat; but possibly the first composition might be sufficient for glasses.

The coating of large glasses must be a very troublesome and tedious operation; and, therefore, coated glass is never used but in experiments. When large distillations must be performed in the way of trade, recourse must be had either to iron pots, or to earthen ware. Of the most proper kinds of earthen ware for resisting violent heats, we shall take notice under the article *Fusion*.

In all distillations by the retort, a considerable quantity of air, or other incondensable vapour, is extricated; and to this it is absolutely necessary to give vent, or the vessels would be burst, or the receiver thrown off. For this purpose, Dr Lewis recommends an open pipe to be inserted at the luting, of such an height as will not allow any of the vapour to escape; but this we cannot approve of, as by that means a constant communication is formed between the external atmosphere, and the matters contained in the retort and receiver, which is at all times to be avoided as much as possible, and in some cases, as the distillation of phosphorus, would be very dangerous. The having a small hole drilled in the receiver, which is to be now and then opened, must answer the purpose much better, although it takes more attendance; but if the operator is obliged to leave the vessels for some time, it will be convenient either to leave the little hole open, or to contrive it so that the wooden peg may be pushed out with less force than is sufficient to break the lute.

7. **SUBLIMATION.** This, properly speaking, is only the distillation of a dry substance; and therefore, when volatile matters, such as salt of hartshorn, are to be sublimed, the operation is performed in a glass retort set in a sand bath, and the salt passes over into the receiver. The cucurbit and alembic were formerly much in use for this purpose; and a blind head, without any spout, was applied. A much simpler apparatus, however, is now made use of. A globe made of very thin glass, or an oblong vessel of the same kind, answers the more common purposes of sublimation. For experiments, Florence flasks are excellent; as being both very cheap, and having the necessary shape and thinnels requisite for bearing the heat without cracking. The matter to be sublimed must not, on almost any occasion, take up more than a third part of the subliming vessel. It is to be set in a sand-bath, that the heat may be more equally applied than it could otherwise be. The heat must be no greater, or very little, than is necessary for sublimation, or it will be in danger of flying out at the mouth of the subliming vessel, or of choking it up so as to burst. The upper part of the vessel, too, must by no means be kept cool, but slightly covered with sand, that the matter may settle in a kind of half-melted state, and will thus form a compact, hard cake, which is the appearance sublimates are expected to have. Hence this operation requires a good deal of caution, and is not very easily performed.

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Deflagration.

8. **DEFLAGRATION.** This operation is always performed by means of nitre, except in making the flowers of zinc. It requires open vessels of earth, or iron; the latter are very apt to be corroded, and the former to imbibe part of the matter. To perform this process with safety, and without loss, the nitre ought to be mixed with whatever matter is to be deflagrated with it, and thrown by little and little into the vessel previously made red-hot. If much is put in at once, a great deal will be thrown out by the violent commotion; and to perform this operation in close vessels is in a manner impossible, from the prodigious quantity of elastic vapour generated by the nitre. Care must also be taken to remove the whole mixture to some distance from the fire, and not to bring back any spark from the quantity deflagrating, with the spoon which puts it in; otherwise the whole would irremediably be consumed at once.

9. **CALCINATION.** This is the subjecting any matter to a heat so violent, as to dissipate some part of it, without melting what remains. It is often practised on metallic substances, particularly lead, for obtaining the calx of that metal called *minium*, or red lead.

This operation, as indeed all other chemical ones, is best performed in large quantities, where a particular furnace is constructed on purpose, and a fire kept on day and night without interruption. The flame is made to play over the surface of the metal, and it is continually stirred so as to expose different parcels of it to the action of the heat.

10. **FUSION.** This is when a solid body is exposed to such a degree of heat as makes it pass from a solid to a fluid state; and as different substances are possessed of very different degrees of fusibility, the degrees of melting heat are very various.

Besides the true fusion, there are some kinds of salts which retain to large a proportion of water in their crystals, as to become entirely fluid upon being exposed to a very small degree of heat. This is commonly called the *watery fusion*; but is really a *solution* of the salt in that quantity of water retained by it in its crystalline form: for such salts afterwards become solid by the evaporation of the water they contained; and then require a strong red heat to melt them thoroughly, or perhaps are absolutely unfusible.

Of all known substances, unctuous and inflammable ones become fluid with the least heat; then come the more fusible metals, lead, tin, and antimony; then some of the more fusible salts; and then the harder metals, silver, gold, copper, and iron; then the mixtures for making glass; and last of all, the metal called *platina*, which has hitherto been incapable of fusion, except by the violent action of the sun-beams in the focus of a large burning glass. This substance seems to be the most refractory of all others, even the hardest flints melting into glass long before it. (See **PLATINA**.)

Fusion of small quantities of matter is usually performed in pots called *crucibles*; which, as they are required to stand a very violent heat, must be made of the most refractory materials possible.

The making of crucibles belongs properly to the crucible, potter; but as a *chemist* ought to be the judge of their composition, we shall here give some account of the different

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different attempts to make these vessels of the necessary strength.

All earthen vessels are composed, at least partly, of that kind which is called the *argillaceous earth* or *clay*, because these only have the necessary ductility, and can be formed into vessels of the proper form. Pure clay is, by itself, absolutely unfusible; but is exceedingly apt to crack when exposed to sudden changes of heat and cold. It is also very apt to melt when mixed with other substances, such as calcareous earths, &c. When mixed in a certain proportion with other materials, they are changed by violent heat into a kind of half-melted substance, such as our stone-bottles. They cannot be melted completely, however, by almost any fire; they are also very compact, and will contain the most fusible substances, even glass of lead itself; but as they are very apt to crack from sudden changes of heat and cold, they are not so much used; yet, on particular occasions, they are the only ones which can be made use of.

The more dense any kind of vessels are, the more apt they are, in general, to break, by a sudden application of heat, or cold: hence crucibles are not, in general, made of the greatest density possible; which is not at all times required. Those made at Hesse, in Germany, have had the best reputation for a long time. Mr Pott, member of the academy of sciences at Berlin, hath determined the composition of these crucibles to be, one part of good refractory clay, mixed with two parts of sand, of a middling fineness, from which the finest part has been sifted. By sifting the finer particles from the sand, too great compactness is avoided: but at the same time this mixture renders them apt to be corroded by vitrifying matters kept a long time in fusion; for these do not fail to act upon the sand contained in the composition of the crucible, and, forming a vitreous mass, at last run through it.

This inconvenience is prevented, by mixing, instead of sand, a good baked clay in gross powder. Of a composition of this kind are made the glass-house pots, which sometimes sustain the violent heat employed in making glass, for several months. They are, however, gradually consumed by the glass, and become constantly more and more thin.

As the containing vessel, however, must always be exposed to a more violent heat than what is contained in it, crucibles ought to be formed of such materials as are not vitrifiable by any heat whatever. But, from the attempts made to melt platina, it appears, that of all known substances it would be the most desirable for a melting-vessel. Hessian crucibles, glass-house pots, Sturbridge-clay, in short every substance which could be thought of to resist the most violent heat, were melted in such a manner as even to stop up the pipes of large bellows, while platina was not altered in the least; and Messrs Macquer and Beaumé have shewn, that though platina cannot be melted so as to cast vessels of it, it may nevertheless be cupelled with lead so as to become malleable, and thus vessels might otherwise be made from that substance.

The extreme scarcity of this mineral, however, leaves no room to hope any thing from it; and Mr Pott has made so many experiments upon clays mixed with different substances, that he has in a manner ex-

hausted the subject. The basis of all his compositions was clay. This he mixed in different proportions with metallic calces, calcined bones, calcareous earths, talcs, amianthus, albestus, pumice-stones, tripoli, and many others; but he did not obtain a perfect composition from any of them. The best crucibles, according to Scheffer, cannot easily contain metals dissolved by sulphur, in the operation of parting by means of sulphur. They may be made much more durable and solid, by steeping them a few days in linseed-oil, and strewing powdered borax upon them before they are dried.

The results of Mr Pott's experiments are. 1. Crucibles made of fat clays are more apt to crack when exposed to sudden heat, than those which are made of lean or meagre clays. *Meagre clays* are those which contain a considerable quantity of sand along with the pure argillaceous earth; and *fat clays* are those which contain but little. 2. Some crucibles become porous by long exposure to the fire, and imbibe part of the contained metals. This may be prevented, by glazing the internal and external surfaces; which is done, by moistening these with oil of tartar, or by strewing upon them, when wetted with water, powdered glass of borax. These glazings are not capable of containing glass of lead. 3. Crucibles made of burnt clay grossly powdered, together with unburnt clay, were much less liable to crack by heat than crucibles made of the same materials where the burnt clay was finely powdered, or than crucibles made entirely of unburnt clay. 4. If the quantity of unburnt clay be too great, the crucible will be apt to crack in the fire. Crucibles made of 10 ounces of unburnt clay, 10 ounces of grossly powdered burnt clay, and three drachms of calcined vitriol, are capable of retaining melted metals, but are pervaded by glass of lead. The following composition is better than the preceding: Seven ounces of unburnt clay, 14 ounces of grossly powdered burnt clay, and one drachm of calx of vitriol. These crucibles may be rendered more capable of containing glass of lead, by lining their internal surfaces, before they are baked, with unburnt clay diluted with water. They may be further strengthened by making them thicker than is usually done; or by covering their external surfaces with some unburnt clay, which is called *arming* them.

5. The composition of crucibles most capable of containing the glass of lead, was 18 parts of grossly powdered burnt clay, as much unburnt clay, and one part of fusible spar. These crucibles must not, however, be exposed too suddenly to a violent heat. 6. Crucibles capable of containing glass of lead very well, were made of 24 parts of unburnt clay, four parts of burnt clay, and one part of chalk. These require to be armed. 7. Plume alum powdered, and mixed with whites of eggs and water, being applied to the internal surface of a Hessian crucible, enabled it to retain for a long time glass of lead in fusion. 8. One part of clay, and two parts of Spanish chalk, made very good crucibles. The substance called Spanish chalk is not a calcareous earth, but appears to be a kind of steatites. 9. Two parts of Spanish chalk, and one part of powdered tobacco-pipes, made good lining for common crucibles. 10. Eight parts of Spanish chalk, as much burnt clay, and one part of litharge, made solid crucibles

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bles. 17. Crucibles made of black lead are fitter than Hessian crucibles for melting metals; but they are so porous, that fused salts pass entirely through them. They are more tenacious than Hessian crucibles, are not so apt to burst in pieces, and are more durable. 12. Crucibles placed with their bottoms upwards, are less apt to be cracked during the baking, than when placed differently. 13. The paste of which crucibles are made, ought not to be too moist; else, when dried and baked, they will not be sufficiently compact: hence they ought not to be so moist as to be capable of being turned on a potter's lathe; but they must be formed in brass or wooden moulds.

On this subject Dr Lewis hath made several observations, the principal of which are, 1. Pure clay softened to a due consistence for being worked, not only coheres together, but sticks to the hands. In drying, it contracts 1 inch or more in 12; and hence it is very apt to crack, unless it is dried exceeding slowly. In burning, it is subject to the same inconvenience, unless very slowly and gradually heated. When thoroughly burnt, if it has escaped those imperfections, it proves solid and compact; and so hard as to strike fire with steel. Vessels made of it are not penetrated by any kind of liquid; and resist salts and glasses brought into the thinnest fusion, excepting those which by degrees corrode and dissolve the earth itself, as glass of lead; and even this penetrating glass, is resisted by it better than by almost any other earth; but, in counterbalance to these good qualities, they cannot be heated or cooled, but with such precautions as can rarely be complied with in the way of business, without cracking, or flying in pieces.

2. Clay that has been once exposed to any considerable degrees of heat, and then powdered, has no longer any tenacity. Fresh clay, divided by a due proportion of this powder, proves less tenacious than by itself; not sticking to the hands, though cohering sufficiently together. It shrinks less in drying, is less apt to crack, and less susceptible of injury from alterations of heat and cold; but at the same time is less solid and compact. Considerable differences are observed in these respects; not only according to the quantity of dividing matter, but according as it is in finer or coarser powder.

3. Vessels made with a moderate proportion of fine powder, as half the weight of the clay, are compact and solid, but still very apt to crack, from sudden heat or cold: those with a larger proportion, as twice or thrice the quantity of the clay, are free from that imperfection, but so friable as to crumble between the fingers. Nor does there appear to be any medium between a disposition to crack, and to crumble; all the compounds made of clay and fine powders having the one or the other, or both imperfections. Coarser powders of the size of middling sand, form, with an equal weight of clay, compounds sufficiently solid, and much less apt to crack than the mixtures with fine powders. Two parts of coarse powder, and one of clay, prove moderately solid, and but little disposed to crack: a mixture of three parts and one, though heated and cooled suddenly, does not crack at all, but suffers very fluid substances to transude through it; solidity, and resistance to quick vicissitudes

tudes of heat and cold, seeming here also to be incompatible.

4. Pure clay, mixed with pure clay that has been burnt, is no other than one simple earth; and is neither to be melted, nor softened, nor made in any degree transparent, with the most intense fires.

5. Mixtures of clay with gypseous earths burn whiter than clay alone; in certain proportions, as two parts of clay to three of gypsum, they become, in a moderate fire, semi-transparent, and in a strong one they melt.

6. Calcareous earths in small proportion bake tolerably compact and white; and added to other compositions, seem to improve their compactness. If the quantity of the calcareous earth nearly equals that of the clay, the mixture melts into a yellow glass; if it considerably exceeds, the product acquires the qualities of quicklime.

7. Vessels made from clay and sand, in whatever proportion, do not melt in the strongest fire; but they sometimes bend or soften, so as to yield to the tongs. Glasses in thin fusion penetrate them by dissolving the sand. If gypseous or calcareous earths are urged in such crucibles with a vehement heat, the vessels and their contents run all into one mass. In moderate fires, these vessels prove tolerably compact, and retain most kinds of salts in fusion: but they are liable to crack, especially when large; and do not long sustain melted metals, being burst by their weight. Such are the Hessian crucibles.

8. Mixtures of clay and black-lead, which seems a species of talc, are not liable to crack from alternations of heat and cold; but are extremely porous. Hence black-lead crucibles answer excellently for the melting of metals, and stand repeated fusions; whilst salts flowing thin, transude through them almost as water through a sieve: sulphureous bodies, as antimony, corrode them.

9. Pure clay, softened with water, and incrustated on earthen vessels that have been burnt, does not adhere to them, or scales off again upon exposure to the fire; applied to unburnt vessels, it adheres and incorporates. Divided clay unites with them in both states. Vitreous matters, melted in vessels of pure clay, adhere so firmly as not to be separated; from vessels of divided clay they may be knocked off by a hammer.

10. The saline fluxes which promote the fusion of clay, besides the common ones of all earths, alkali and borax, are chiefly arsenic fixed by nitre, and the fusible salt of urine, both which have little effect on the other earths though mixed in a large proportion. Nitre which readily brings the crystalline earths into fusion, and sal mirabile and sandiver, powerful fluxes for the calcareous earths, do not perfectly vitrify with clay. Burnt clay does not differ in these respects from such as has not been burnt; nor in that singular property of vitrifying with gypseous or calcareous earths, without any saline or metallic addition; the utmost vehemence of fire seeming to destroy only its ductility, or that power by which it coheres when its parts are moistened with water.

But, though it seems impossible to make perfect vessels from mixtures of clay in its two different states,

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More perfect vessels to be hoped for from porcelain.

of burnt and unburnt, more is to be hoped from the mixtures which are employed in making porcelain. Manufactories of this kind of ware have been attempted in different countries, (see PORCELAIN); and in some places the qualities requisite for chemical vessels have been given to it in a very surprising degree. The count de Lauraguais, a French nobleman, and member of the academy of sciences, has distinguished himself in a very eminent manner by attempts of this kind. The translator of the chemical dictionary assures us, that he had it from a gentleman of undoubted veracity, that this nobleman having heated a piece of his porcelain red hot, threw it into cold water, without breaking or cracking it.

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Mr Reaumur's porcelain.

The most useful attempt, however, for the purposes of chemistry, seems to be the discovery by Mr Reaumur of converting common green glass into porcelain. This was published so long ago as the year 1739; yet we have not heard of any chemist, no not Dr Lewis himself, who has made trial of chemical vessels formed of this sort of porcelain, although the very use to which Mr Reaumur thought this preparation could be applicable was that of bringing chemical vessels to a degree of perfection which could not otherwise be done. The following is the result of Mr Reaumur's experiments.

Green glass, surrounded with white earthy matters, as white sand, gypsum, or plaster of Paris, &c. and exposed to a considerable heat not strong enough to alter its figure, as that of a potter's furnace, acquires different shades of blue, and by degrees begins to grow white. On breaking the glass, the white coat appears to be composed of fine, white, glossy, satin-like fibres, running transversely, and parallel to one another; the glass in the middle being scarcely altered. On continuing the cementation, the change proceeds further and further, till at length the white fibrous parts from both sides meet in the middle, and no appearance of glass remains. By this means, entire vessels of glass may be changed into porcelain.

The substance into which glass is thus converted, is opaque, compact; internally of great whiteness, equal to that of the finest china-ware; but, externally, of a much duller hue. It is considerably harder than glass, much less fusible in the fire, and sustains alterations of heat and cold without injury. Vessels of it, cold, bear boiling liquors; and may be placed on the fire at once, without danger of their cracking. "I have put a vessel of this porcelain (says the author) into a forge, surrounded it with coals, and kept vehemently blowing for near a quarter of an hour; I have melted glass in this vessel, without its having suffered any injury in its figure." If means could be found of giving the outside a whiteness equal to the internal part, glass vessels might thus be converted into a valuable kind of porcelain, superior to all that have hitherto been made. Chersiftry, says he, may receive from this discovery, in its present state, such vessels as have been long wanted; vessels which, with the compactness and impenetrability of glass, are also free from its inconveniences.

The common green glass bottles yield a porcelain of tolerable beauty; window-glasses, and drinking-glasses, a much inferior one; while the finer kinds

of crystalline glasses afforded none at all. With regard to the cementing materials, he found white sand and gypsum, or rather a mixture of both, to answer best. Coloured earths generally make the external surface of a deeper or lighter brown colour; foot and charcoal, of a deep black, the internal part being always white.

The account of this kind of porcelain given by Mr Reaumur, induced Dr Lewis, who had also observed the same changes on the bottom of glass-retorts exposed to violent heat in a sand-bath, to make further experiments on this matter, an account of which he has published in his *Philosophical Commerce of Arts*. The results of his experiments were, 1. Green glass, cemented with white sand, received no change in a heat below ignition. 2. In a low red heat, the change proceeded exceeding slowly; and in a strong red heat, approaching to white, the thickest pieces of glass bottles were thoroughly converted in the space of three hours. 3. By continued heat, the glass suffered the following progressive changes: first, its surface became blue, its transparency was diminished, and a yellowish hue was observable when it was held between the eye and the light. Afterwards it was changed a little way on both sides into a white substance, externally still bluish; and, as this change advanced still further and further within the glass, the colour of the vitreous part in the middle approached nearer to yellow: the white coat was of a fine fibrous texture, and the fibres were disposed nearly parallel to one another, and transverse to the thickness of the piece: by degrees the glass became white and fibrous throughout, the external bluishness at the same time going off, and being succeeded by a dull whitish or dun colour. By a still longer continuance in the fire, the fibres were changed gradually from the external to the internal part, and converted into grains; and the texture was then not unlike that of common porcelain. The grains, at first fine and somewhat glossy, became by degrees larger and duller; and at last the substance of the glass became porous and friable, like a mass of white sand slightly cohering. 4. Concerning the qualities of this kind of porcelain, Dr Lewis observes, that, while it remained in the fibrous state, it was harder than common glass, and more able to resist the changes of heat and cold than glass, or even porcelain; but, in a moderate white heat, was fusible into a substance not fibrous, but vitreous and smooth, like white enamel: that when its texture had become coarsely granulated, it was now much softer and unfusible; and lastly, that when some coarsely granulated unfusible pieces, which, with the continuance of a moderate heat, would have become porous and friable, were suddenly exposed to an intense fire, they were rendered remarkably more compact than before; the solidity of some of them being superior to that of any other ware.

It seems surprising that this able chemist, who, on other occasions, has the improvements of the arts so much at heart, did not put some vessels of this kind of porcelain to other severe trials, besides attempting to fuse it by itself with a violent fire: for though pieces of it were absolutely unfusible, we are not sure but they might have been corroded by alkaline salts, acids,

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Dr Lewis's experiments.

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This substance is so imperfect.

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acids, calcareous earths, or glafs of lead; nay, it fhould feem very probable that they would have been fo, in which cafe they would not be much fuperior to the veffels made from earthy materials. When a firft-rate chemift publifhes any thing in an imperfect ftate, inferior ones are difcouraged from attempting to finifh what he has begun; and thus, notwithstanding that thefe experiments have been fo long publifhed, nobody has yet attempted to inveftigate the properties of this kind of porcelain, by getting chemical veffels made of it, and trying how they anſwer for crucibles, or retorts.

All that has been faid concerning the proper materials for crucibles, muft likewife be applicable to the materials for retorts, which are required to ftand a very violent heat. Mr Reaumur's porcelain bids faireft for anſwering the purpoſe of retorts, as well as crucibles. The great difadvantage of the common earthen ones, is, that they fufter a quantity of volatile and penetrating vapours to paſs through them. This is very obſervable in the diſtillation of phosphorus; and though this ſubſtance has not hitherto been uſed for any purpoſe in medicine, and very little in the arts, its acid only being ſometimes uſed as a flux, if vefſels could be made capable of confining all the ſteam, and at the ſame time bearing the heat neceſſary for its diſtillation, phosphorus, perhaps, might be obtained in ſuch quantity, as to ſhew that it is a preparation not altogether ufeleſs.

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Stone-ware
veſſels cor-
roded.

With regard to ſtone-ware vefſels, and all thoſe in which the compoſition of ſand or flint enters, we ſhall only further obſerve, that they will be corroded by fixed alkaline ſalts, eſpecially of the cauſtic kind, in a very moderate heat. Dr Black, having evaporated ſome cauſtic ley in a ſtone-ware baſon, and then melted the dry ſalt in the ſame veſſel, found it fo corroded, as afterwards to be full of ſmall holes; and he found nothing to reſiſt the action of this ſalt ſo well as ſilver.

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Maceration.

11. MACERATION, OR DIGESTION. This is the mixing two bodies, generally a ſolid and a fluid, together, and then expoſing them to a moderate degree of heat for a conſiderable length of time, that ſo they may have the better opportunity of acting upon one another. Diſteſtion is uſually performed in the glaſſes already mentioned, called *matraſſes* or *bolt-heads*; and is done in a ſand heat. When any of the ſubſtances are very volatile, as ſpirit of wine, or the matter requires to be heated ſo conſiderably that a quantity of vapour will be raiſed, the necks of the bolt-heads ought to be pretty long; or a tin pipe may be interſed, of ſufficient length to prevent the eſcape of any part of the ſteam.

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Levigation.

12. LEVIGATION. This is the reducing any body to a very fine powder, which ſhall feel quite ſoft between the fingers or when put into the mouth. It is performed by grinding the ſubſtance upon a flat marble ſtone, with ſome water, or by rubbing it in a marble mortar. In the large way, levigation is performed by mills drawn by horſes, or driven by water; ſome of them are ſo ſmall as to be turned by the hand. They conſiſt of two ſmooth ſtones, generally of black marble, or ſome other ſtone equally hard, having ſeveral grooves in each, but made to run in contrary di-

rections to one another when the mill is ſet in motion. The matter being mixed with water, is put in by a funnel, which is fixed into a hole in the upper ſtone, and turns along with it. The under millſtone has round it a wooden ledge, whereby the levigating matter is confined for ſome time, and at length diſcharged, by an opening made for that purpoſe, when it has accumulated in a certain quantity.

In this operation, when the matters to be levigated are very hard, they wear off a part of the mortar, or ſtones on which they are levigated; ſo that a ſubſtance perfectly hard, and which could not be worn by any attrition, is as great a deſideratum for the purpoſes of levigation, as one which could not be melted is for thoſe of fuſion. Dr Lewis propoſes the porcelain of Mr Reaumur as an improvement for levigating planes, mortars, &c. becauſe, while in its fibrous ſtate, it is conſiderably harder than glaſs, and conſequently much leſs liable to abraſion by the harder powders.

In many caſes levigation is very much accelerated by what is called *elutriation*. This is the method by which many of the painters colours are prepared of the requiſite fineneſs; and is performed by mixing any ſubſtance, not totally reduced to the neceſſary degree of fineneſs, with a ſufficient quantity of water, and ſtirring them well together. The finer parts of the powder remain ſome time ſuſpended in the water, while the groſſer particles fall to the bottom. The ſeparation is then eaſily made, by pouring off the water impregnated with theſe fine parts, and committing the reſt to the levigating mill, when it may again be waſhed; and this may be repeated till all the powder is reduced to the utmoſt fineneſs. Subſtances ſoluble in water cannot be levigated in this manner.

Of Chemical Furnaces.

THE two general diviſions we have already mentioned of thoſe who praſtice chemistry, namely, thoſe who have no other view than mere experiment, and thoſe who wiſh to profit by it, render very different kinds of furnaces neceſſary. For the firſt, thoſe furnaces are neceſſary which are capable of acting upon a ſmall quantity of matter, yet ſufficient for all the changes which fire can produce, from ſimple diſteſtion, to the moſt perfect vitrification. For the others, thoſe are to be choſen which can produce the ſame changes upon very large quantities of matter, that as much may be done at once as poſſible.

To avoid the trouble and expence of a number of portable furnaces, a portable one hath long been a deſideratum among thoſe chemiſts who are fond of making experiments. One of the beſt of thoſe, if not the very beſt, that hath yet appeared, is that deſcribed in Shaw's edition of Boerhaave's chemistry, and repreſented fig. 1.

This furnace is made of earth; and, as the workmanſhip of a furnace requires none of the neatneſs or elegance which is required in making potters vefſels, any perſon may eaſily make a furnace of this kind for himſelf, who has time and patience for ſo doing. With regard to the moſt proper materials, all that we have ſaid concerning crucibles and retorts muſt be appli-

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cable to the materials for constructing a furnace; only here we need not care so much for the porosity, or disposition to crumble, as when crucibles or other distilling vessels are to be made.

Plate-iron is commonly directed for the outside of portable furnaces; but we cannot help thinking this is a very needless expence, seeing the coating which it necessarily requires on the inside may be supposed to harden to such a degree as soon to support itself, without any assistance from the plate-iron. This will be the less necessary, if we consider, that, for the thickness of the walls of any furnace where a considerable heat is wanted, two or three inches are by no means sufficient. When the inside of a furnace is heated, the walls, if very thin, are soon penetrated by the heat, and great part of it by this means dissipated in the air. If they are of a sufficient thickness, the heat cannot penetrate so easily; and thus the inner part of the furnace preserves the heat of the fuel, and communicates it to the contained vessel. In the construction of a portable furnace, therefore, it will be convenient to have all parts of it six inches thick at least. This will also give it a sufficient degree of strength; and, as it is formed of several different pieces, no inconvenience can follow from the weight of each of them taken separately.

In Boerhaave's chemistry, this furnace is represented as narrower at bottom than at the top; but we cannot suppose any good reason for such a form, seeing a cylindrical one behaved to answer every purpose much better, as allowing a larger quantity of air to pass through the fuel, and likewise not being so apt to be overturned as it necessarily must be where the upper part is considerably heavier than the lower. We have, therefore, given a representation of it as of a cylindrical form.

The furnace consists of five, or more parts. C, represents the dome, or top of the furnace, with a short earthen funnel E for transmitting the smoke. B, B, B, are moveable cylinders of earth, each provided with a door D, D, D. In Boerhaave's chemistry these doors are represented as having iron hinges and latches; but they may be formed to more advantage of square pieces of earth, having two holes in the middle, by which they may be occasionally taken out, by introducing an iron fork. In like manner, the domes and cylinders, in Boerhaave's chemistry, are represented with iron handles; but they may be almost as easily taken off by the cheaper contrivance of having four holes in each, two directly opposite to one another, into which two short forks may be introduced when the parts are to be separated.

In the lowermost cylinder is to be placed an iron-grate, a little below the door, for supporting the fire. In the under part is a small hole, big enough for introducing the pipe of a pair of good perpetual bellows, when the fire is to be violently excited. Dr Lewis prefers the organ-bellows to any other kind.

When the bellows is used, the whole must stand upon a close cylinder A, that the air may be confined, and made to pass through the fuel. By having more bellowses, the fire may be excited to a most intense degree. In this case, the pipe of every one of them

must enter the cylinder B.

Each of the cylinders should have, in its upper part, a round hole, opposite to its door, for carrying off the smoke, by means of a pipe inserted into it, when the furnace is used for distillations by the sand-bath. Each cylinder ought likewise to have a semicircular cut in the opposite sides, both above and below, that when the under cut of the upper cylinder is brought directly above the upper cut of the lower one, a perfect circle may be formed. These are for giving a passage to the necks of retorts, when distillation by the retort is to be performed. The holes may be occasionally filled with stopples made of the same materials with the body of the furnace.

The most convenient situation for a furnace of this kind would be under a chimney; the vent of which might be easily stopped up by a broad plate of iron, in which a hole ought to be cut for the reception of the earthen tube of the dome. By this means the use of a long tube, which at any rate must be very troublesome, might be easily avoided, and a very strong blast of air would pass through the fuel. If it is found convenient to place the furnace at some distance from the chimney, a plate-iron pipe, must be procured to fit the earthen pipe of the dome, and carry the smoke into the chimney. This pipe will also be of use, when the furnace is used for distillations by the sand-bath; it must then be inserted into the hole opposite to the door of any of the cylinders, and will convey away the smoke, while the mouth of the cylinder is totally covered with a sand-pot.

For portable furnaces, Dr Lewis greatly recommends the large black crucibles, marked n° 60, 'on account of their resisting a violent heat, and being very easily cut by a knife or saw, so that doors, &c. may be formed in them at pleasure. The bottom of one of these large ones being cut out, a grate is to be put into the narrow part of it. For grates, the doctor recommends cast-iron rings, having each three knobs around them. These knobs go into corresponding cavities of the outer rings, and the knobs of the outermost rest on the crucible, which is to be indented a little to receive them, that so the grate may rest the more firmly, and the furnace not be endangered from the swelling of the iron by heat. When this is to be made use of as a melting-furnace, and a violent heat to be excited, another crucible must be inverted on that which contains the fuel, which serves instead of the dome of the last mentioned furnace: and as whatever is said of it must likewise be applicable to the two crucibles when placed above one another, we need give no farther description of the doctor's portable furnace.

No doubt, the great experience of Dr Lewis in chemical matters must give very considerable weight to any thing he advances; and the warmth with which he recommends these furnaces must convince us, that he has found them abundantly answer the purposes of experiments. We cannot help thinking, however, that where a very great and lasting heat is to be given, the thinness, and even the form, of these crucibles, is some objection to their use. It is certain that such a permanent, or, as the workmen call it, a *solid* heat, can never be given where the walls of a furnace are thin,

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Dr Lewis's portable furnaces.

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Objection to their use in some cases.

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thin, as when they are of sufficient thickness. They are also very apt to burst with great heat; and, for this reason, Dr Lewis desires his furnace to be strengthened with copper hoops. This disposition to burst proceeds from the inner parts, which are more intensely heated than the outer, expanding more than these do, and consequently bursting them. Hence the doctor desires his furnace to be strengthened also by putting it within another crucible of a larger size, and the intermediate space to be filled up with a mixture of sifted ashes and water. For most chemical processes, where only a small degree of heat is requisite, these furnaces answer beyond any thing that has hitherto been attempted. The whole is to be supported by an iron ring with three feet.

101
Melting
furnace.
fig. 2.

When furnaces are used in the large way they are always built of brick, and each particular operation has a furnace allotted for itself. The melting-furnace, where very large quantities of matter are not to be melted at once, requires only to be built of brick in such a form as we have already described; only, as it would perhaps be troublesome to procure a dome of the proper figure, the forepart of it may be left entirely open for the admission of melting vessels. The opening may be closed up with bricks and earth, during the operation. There is no necessity for having the inside of a circular form; a square one will answer the purpose equally well. According to the author of the Chemical Dictionary, when the internal diameter D C of such a furnace is 12 or 15 inches, the diameter of the tube G I, 8 or 9 inches, and its height 18 or 20 feet, and when the furnace is well supplied with fuel, an extreme heat is produced; in less than an hour the furnace will be white and dazzling like the sun; its heat will be equal to the strongest glass-house furnace; and in less than two hours will be melted whatever is fusible in furnaces. The hottest part is at H F, 4 or 6 inches above the grate. A plate-iron tube may be advantageously supplied by a short chimney of bricks, built under a pretty high vent, so as the whole may easily be stopped, except that passage which transmits the smoke of the furnace. By this means a very strong current of air will be made to pass through the fuel.

Chemists have generally believed that a wide and high ash-hole greatly increases the power of a melting furnace; but this advantage is found to be merely imaginary, as well as that of introducing the air through a long tube to the ash-hole; unless where the furnace is placed in a close room, so that it is necessary to furnish a greater blast of air than can otherwise have access.

For the form of the furnaces necessary in assaying and smelting of ores, or making glass, see ESSAYING, GLASS, and SMELTING.

When large stills, sand-pots, &c. are to be fixed, with a view to daily use, it is a matter of no small consequence to have them put up in a proper manner. The requisites here are, 1. That the whole force of the fire should be spent on the distilling vessel or sand-pot, except what is necessarily imbibed by the walls of the furnace. 2. That the vessels should be set in such a manner as that they may receive heat even from the furnace walls: for a still which contains any liquid,

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Stills, sand-
pots, &c.
how to set.

can never be made so hot as a piece of dry brick. 3. It is absolutely necessary that the force of the fire be not allowed to collect itself upon one particular part of the vessel; otherwise that part will soon be destroyed. 4. The draught of air into furnaces of this kind ought to be moderate; only so much as will prevent smoke. If a strong blast of air enters, not only a great part of the heat will be wasted by going up the chimney, but the outside of the vessel will be calcined every time the fire is kindled, and thus must be soon rendered unfit for use.

There are few of the common workmen that are capable of building furnaces properly; and it is very necessary for a chemist to know when they are properly done, and to make the workmen act according to his directions. As the still, or whatever vessel is to be fixed, must have a support from the furnace on which it is built, it is evident the whole of its surface cannot be exposed to the fire. For this reason many of these vessels have had only their bottom exposed to the fire; no more space being left for the action of the heat, than the mere circular area of the still bottom; and the fire, passing directly through a hole in the back part of the building, which communicated with a chimney, and consequently had a strong draught, scarce spent any of its force on the still, but went furiously up the chimney. By this means an extraordinary waste of fuel was occasioned; and that part of the still-bottom which was next the chimney receiving the whole force of the flame, was soon destroyed. Attempts were made to remedy this inconvenience, by putting the fire something forward, that it might be at a greater distance from the chimney, and consequently might not spend its force in the air. This too was found to avail very little. A contrivance was then fallen upon to make the vent pass round the body of the still in a spiral form. This was a considerable improvement; but had the inconvenience of making the fire spend itself uselessly on the walls of the furnace, and besides wasted that part of the still which touched the under part of the vent. A much better method is to build the back part of the furnace entirely close, and make the fire come out through a long narrow opening before, after which it passes out through a fine in the back and upper part of the furnace, into the chimney.

The only inconvenience of this form is, that the vent must either be very wide, or it is apt to choke up with soot, which last is a very troublesome circumstance. If the vent is made very wide, a prodigious draught of air rushes through the fuel, and increases the heat to such a degree as to calcine the metal of which the still is made; and, on the other hand, nothing can be more disagreeable than to have the vent of a furnace stopped up with soot. These inconveniences, however, are totally avoided by making two small vents, one on each side of the distilling vessel, which may communicate with a chimney, by means of two tubes either of plate-iron, or formed with clay or bricks, which may be occasionally taken off if they happen to be choked up. The vessel is to be supported by three trunnions, so that the whole surface may be exposed to the fire, excepting a ring the thickness of a brick all round; so that a very strong heat will

will

PRACTICE will be communicated, although the furnace draws but little. The two small vents on each side will draw the flame equally; and by this means the most equal heat can be preserved, and may be pushed so far, as to make the whole bottom and sides of the vessel intensely red. Such a construction as this is more especially useful for sand-pots, and those which are used for distilling alkaline spirits from bones.

In the use of the furnaces hitherto described, the attendance of the operator is necessary, both for inspecting the process, and for supplying and animating the fuel. There are some operations of a slower kind, that require a gentle heat to be continued for a length of time; while demand little attendance in regard to the operations themselves; and in which, of consequence, it is extremely convenient to have the attendance in regard to the fire as much as possible dispensed with. This end has been answered by the furnace called *athanor*; but the use of it has been found attended with some inconveniences, and it is now generally laid aside.

Sundry attempts have been made for keeping up a continued heat, with as little trouble as in the *athanor*, by the flame of a lamp; but the common lamp-furnaces have not answered so well as could be wished. The lamps require frequent snuffing, and smoke much; and the soot accumulated on the bottom of the vessel placed over them, is apt, at times, to fall down and put out the flame. The largeness of the wick, the irregular supply of oil from the reservoir by jets, and the oil being suffered to sink considerably in the lamp, so that the upper part of the wick burns to a coal, appeared to be the principal causes of these inconveniences; which, accordingly, were found to be in great measure remedied by the following construction.

Fig. 8.

The lamp consists of a brass pipe, 10 or 12 inches long, and about a quarter of an inch wide, inserted at one end into the reservoir of the oil, and turned up at the other to an elbow, like the bole of a tobacco-pipe, the aperture, which is extended to the width of near two inches. On this aperture is fitted a round plate, having 5, 6, or 7 small holes, at equal distances, round its outer part, into which are inserted as many pipes about an inch long: into these pipes are drawn threads of cotton, all together not exceeding what in the common lamps form one wick: by this division of the wick, the flame exposes a larger surface to the action of the air, the fuliginous matter is consumed and carried off, and the lamp burns clear and vivid.

The reservoir is a cylindric vessel, eight or ten inches wide, composed of three parts, with a cover on the top. The middle partition communicates, by the lateral pipe, with the wicks; and has an up-

right open pipe folded into its bottom, whose top reaches as high as the level of the wicks; so that, when this part is charged with oil, till the oil rises up to the wicks in the other end of the lamp, any further addition of oil will run down through the upright pipe into the lower division of the reservoir. The upper division is designed for supplying oil to the middle one; and, for that purpose, is furnished with a cock in the bottom, which is turned more or less, by a key on the outside, that the oil may drop fast enough to supply the consumption, or rather faster, for the overplus is of no inconvenience, being carried off by the upright pipe; so that the oil is always, by this means, kept exactly at the same height in the lamp. For common uses, the middle division alone may be made to suffice; for, on account of its width, the linking of oil will not be considerable in several hours burning. In either case, however, it is expedient to renew the wicks every two or three days; oftener or seldom, according as the oil is more or less foul; for its impure matter, gradually left in the wicks, occasions the flame to become more and more dull. For the more convenient renewing of them, there should be two of the perforated plates; that, when one is removed, another, with wicks fitted to it, may be ready to supply its place.

One of the black lead-pots, recommended by Dr Lewis for his portable furnace, makes a proper furnace for the lamp. If one is to be fitted up on purpose for this use, it requires no other aperture than one in the bottom for admitting air, and one in the side for the introduction of the elbow of the lamp. The reservoir stands on any convenient support without the furnace. The stopper of the side aperture consists of two pieces, that it may be conveniently put in after the lamp is introduced; and has a round hole at its bottom fitting the pipe of the lamp. By these means, the furnace being left upon a trestle or open foot, the air enters only underneath, and spreads equally all round, without coming in streams, whence the flame burns steady. It is not advisable to attempt raising the heat higher than about the 450th degree of Fahrenheit's thermometer, a heat somewhat more than sufficient for keeping tin in perfect fusion. Some have proposed giving a much greater degree of heat in lamp-furnaces, by using a number of large wicks; but when the furnace is so heated, the oil emits copious fumes, and its whole quantity takes fire. The balneum, or other vessel including the subject-matters, is supported over the flame by an iron ring, as already described in the sand-bath and still: a bath is here particularly necessary, as the subject would otherwise be very unequally heated, only a small part of the vessel being exposed to the flame.

PART II. PRACTICE OF CHEMISTRY.

SECT. I. *Salts.*

I. VITRIOLIC ACID, and its Combinations.

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Never found pure.

THE vitriolic acid is never found pure, but always united with some proportion, either of phlogiston, or metallic and earthy substances. Indeed there is

scarce any kind of earth which does not contain some portion of this acid, and from which it may always some way or other be separable. When pure, the vitriolic acid appears in the form of a transparent colourless liquor. By distilling in a glass retort, the aqueous part arises, and the liquor which is left becomes gradually more and more acid. This operation is generally

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Rectifica-
tion.

nerally called the *rectification*, or *dephlegmation*, of the acid. After the distillation has gone on for some time, the water adheres more strongly to what remains in the retort, and cannot be forced over without elevating part of the acid along with it. The remaining acid, being also exceedingly concentrated, begins to lose its fluidity, and puts on the appearance of a clear oil. This is the state in which it is usually sold, and then goes by the name of *oil of vitriol*. If the distillation is still further continued, with a heat below 600° of Fahrenheit's thermometer, the acid gradually loses more and more of its fluidity, till at last it congeals in the cold, and becomes like ice. In this state it is called the *icy oil of vitriol*. Such exceeding great concentration, however, is only practised on this acid for curiosity. If the heat be suddenly raised to 600°, the whole of the acid rises, and generally cracks the receiver. Clear oil of vitriol is immediately turned black by an admixture of the smallest portion of inflammable matter.

105
Attracts
moisture
from the
air.

The icy oil of vitriol, and even that commonly sold, attracts the moisture of the air with very great force. Newman relates, that having exposed an ounce of this acid to the air, from September 1736 to September 1737, at the end of the twelvemonth it weighed seven ounces and two drachms; and thus had attracted from the air above six times its own weight of moisture. This quantity, however, seems extraordinary; and it is probable, that in so long a time some water had been accidentally mixed with it; for Dr Gould, professor at Oxford, who seems to have tried this matter fully, relates that three drachms of oil of vitriol acquired, in 57 days, an increase only of six drachms and an half. The acid was exposed in a glass of three inches diameter; the increase of weight the first day was upwards of one drachm; in the following days less and less, till, on the fifty-sixth, it scarce amounted to half a grain. The liquor, when saturated with humidity, retained or lost part of its acquired weight, according as the atmosphere was in a moist or dry state; and this difference was so sensible as to afford an accurate hygrometer. Hoffman having exposed an ounce and two scruples in an open glass-dish, it gained seven drachms and a scruple in 14 days.

106
Productive
both of cold
and heat.

This acid, when mixed with a large quantity of water, makes the temperature something colder than before; but if the acid bears any considerable proportion to the water, a great heat is produced, so as to make the vessel insupportable to the hand; and therefore such mixtures ought very cautiously, or rather not at all, to be made in glass vessels, but in the common stone-bottles, or leaden vessels, which are not apt to be corroded by this acid. The greatest heat is produced by equal parts of acid and water.

107
Quantity of
alkali satu-
rated by it.

Though the vitriolic acid unites itself very strongly with alkalies, both fixed and volatile, it does not saturate near so much of the latter as of the former. A pound of oil of vitriol will saturate two of the common fixed alkali, but scarce one of volatile alkali. The specific gravity of good oil of vitriol is to water as 17 to 8.

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Effects on
the human
body.

If the concentrated acid is applied slightly and superficially to the skin of a living animal, it raises a

violent burning heat and pain; but a larger quantity pressed on, so as to prevent the ingress of aerial moisture, occasions little pain or erosion. If diluted with a little water, it proves corrosive in either case. Largely diluted with water, this acid is employed medicinally for checking putrefaction, abating heat, and quenching thirst; in debilities of the stomach, and heartburn. To persons of weak and misound lungs, to women who give suck, to hydropic or emaciated persons, it is injurious. Some recommend it as a collyrium for sore eyes; but as it conglutates the animal juices, corroding and indurating the solids, it seems very unfit for being applied to that tender organ.

109
Difficulty
of procu-
ring it by
itself.

The vitriolic acid is so much used in different arts and manufactures, that the making of it has become a trade by itself; and the procuring it in plenty, and at a cheap rate, would be a very advantageous piece of knowledge to any person who could put it in practice. This, however, is very far from being easily done; for though it exists in almost every mineral substance, the attraction betwixt this acid and the bases with which it unites, is found to be so strong, that we can only decompose such combinations by presenting another substance to the acid, to which it has a greater attraction than that one wherewith it is joined. Thus the first combination is indeed dissolved, but we have another from which it is equally difficult to extricate the acid by itself. Thus, if we want to disengage the vitriolic acid from any metallic substance, suppose iron, this may be easily done by throwing a calcareous earth into a solution of green vitriol. We have now a compound of vitriolic acid with the calcareous earth, which is known by the name of *gypsum* or *scenites*. If we want to decompose this, we must apply a volatile or a fixed alkali; and the result of this will constantly be a new combination, which we are unable to decompose, and indeed more so, than the first. There are two general methods which have been in use for procuring the vitriolic acid in such quantity as to supply the demands of trade. The one is from pyrites, and the other from sulphur.

The extraction of Vitriolic Acid from *Pyrites*, the making of Coppersas, and obtaining the pure Oil of Vitriol from it.

110
Pyrites,
where
found.

Pyrites are found in large quantity in the coal-mines of England, where most of the coppersas is made. They are very hard and heavy substances, having a kind of brassy appearance, as if they contained that metal; and hence they are called *brasses* by the workmen. A very large quantity of these is collected, and spread out upon a bed of stiff clay to the depth of three feet. After being some time exposed to the air, the uppermost ones lose their metallic appearance, split, and fall to powder. The heaps are then turned, the under part uppermost, so as to expose fresh pyrites to the air. When they are all reduced to powder, which generally requires three years, the liquor, which is formed by the rain-water running from such a large mass, becomes very acid, and has likewise a styptic vitriolic taste. It is now conveyed into large cisterns lined with clay, whence it is pumped into a very large flat vessel made of lead. This vessel, which contains about 15 or 20 tons of liquor, is supported by cast-iron plates

PRACTICE

plates about an inch thick, between which and the lead a bed of clay is interposed. The whole rests upon narrow arches of brick, under which the fire is placed. Along with the liquor, about half a ton or more of old iron is put into the evaporating vessel. The liquor, which is very far from being saturated with acid, acts upon the iron, and, by repeated filling up as it evaporates, dissolves the whole quantity. By the time this quantity is dissolved, a pellicle is formed on the surface. The fire is then put out; and as such a prodigious quantity of liquor does not admit of filtration, it is left to settle for a whole day, and then is let off by a cock placed a little above the bottom of the evaporating vessel, so as to allow the impurities to remain behind. It is conveyed by wooden spouts to a large leaden cistern, five or six feet deep, sunk in the ground, and which is capable of containing the whole quantity of liquor. Here the copperas crystallizes on the sides, and on sticks put into the liquor. The crystallization usually takes up three weeks. The liquor is then pumped back into the evaporating vessel; more iron, and fresh liquor from the pyrites, are added; and a new lution takes place. See n^o 41.

Copperas is used, in dyeing, for procuring a black colour; and is an ingredient in making common ink. It is also used in medicine as a corroborant, under the name of *salt of steel*; but before it is used with this intention, it is redissolved in water, and crystallized, with the addition of a little pure oil of vitriol. Whether it is at all mended by this supposed purification, either in appearance or quality, is very doubtful.

This process furnishes us first with a very impure vitriolic acid, which could not be applied to any useful purpose; afterwards with an imperfect neutral salt, called *green vitriol*, which is applicable to several purposes where the pure acid itself could not be used; but still the acid by itself is not to be had, without a very troublesome operation.

Though this acid adheres very strongly to iron, it is capable of being expelled from it by fire; yet not without a very violent and long-continued one. If we attempt to distil green vitriol in a retort, it swells and boils in such a manner by the great quantity of water contained in its crystals, that the retort will almost certainly crack; and though it should not, the salt would be changed into an hard stony mass, which the fire could never sufficiently penetrate so as to extricate the acid. It must therefore be calcined, previous to the distillation. This is best done in flat iron-pans, set over a moderate fire. The salt undergoes the watery fusion, (see *Fusion*); after which it becomes opaque and white. By a continuance of the fire, it becomes brown, yellow, and at last red. For the purposes of distillation, it may be taken out as soon as it has recovered its solidity.

The dry vitriol, being now reduced to powder, is to be put into an earthen retort, or rather long neck, (a kind of retort where the neck issues laterally, that the vapours may have little way to ascend,) which it may nearly fill. This retort must be placed in a furnace capable of giving a very strong heat, such as the melting furnace we have already described. A large receiver is to be fitted on; and a small fire made in the furnace, to heat the vessels gradually. White

fumes will soon come over into the receiver, which will make the upper part warm. The fire is to be kept of an equal degree of strength, till the fumes begin to disappear, and the receiver grows cool. It is then to be increased by degrees; and the acid will become gradually more and more difficult to be raised, till at last it requires an extreme red, or even white heat. When nothing more will come over, the fire must be suffered to go out, the receiver be muffled, and its contents poured into a bottle fixed with a glass stopper. A sulphureous and suffocating fume will come from the liquor, which must be carefully avoided. In the retort, a fine red powder will remain, which is used in painting, and is called *colcothar of vitriol*. It is useful on account of its durability; and, when mixed with tar, has been employed as a preservative of wood from rotting; but Dr Lewis prefers finely powdered pit-coal. As a preservative for masts of ships, he recommends a mixture of tar and lamp-black, concerning which he relates the following anecdote.

"I have been favoured by a gentleman on board of a vessel in the East Indies, with an account of a violent thunder-storm, by which the main-mast was greatly damaged, and whose effects on the different parts of the mast were pretty remarkable. All the parts which were greased or covered with turpentine were hurt in pieces: those above, between and below the greased parts, as also the yard-arms, the round top or scaffolding, coated with tar and lamp-black, remained unurt."

Oil of vitriol, when distilled in this manner, is altered into a black colour, and must therefore be rectified by distillation in a glass retort. When the acid has attained a proper degree of strength, the blackness either flies off, or separates and falls to the bottom, and the liquor becomes clear. The distillation is then to be discontinued, and the clear acid which is left in the retort kept for use.

This was the first method by which the vitriolic acid was obtained; and from its being distilled from vitriol has ever since retained the name of *oil of vitriol*. Green vitriol is the only substance from which it is practicable to draw this acid by distillation; when combined with calcareous earths, or even copper, (though to this last it has a weaker attraction than to iron,) it resists the fire most obstinately. When distillation from vitriol was practised, large furnaces were erected for that purpose, capable of containing an hundred long necks at once: but as it has been discovered to be more easily procurable from sulphur, this method has been laid aside, and it is now needless to describe these furnaces.

To procure the Vitriolic Acid from Sulphur.

This substance contains the vitriolic acid in such plenty, that every pound of sulphur is reckoned to contain 15 ounces of pure acid; which being in a state perfectly dry, is consequently of a strength far beyond that of the most highly rectified oil of vitriol. Common oil of vitriol requires to be distilled to one fourth of its quantity before it will coagulate when cold; and even in this state, it undoubtedly contains some water. Making allowances, therefore, for the acid which rises in distillation, we may reckon, that in a pound

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Preserva-
tives of
wood.

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tion.

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of vitriolic
acid from
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Quantity of
acid in sul-
phur.

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pound of oil of vitriol, 10 ounces are mere water. Every pound of sulphur therefore, if all the acid it contains could be preserved, ought to yield two pounds and an half of highly concentrated acid. No method, however, has as yet been fallen upon to condense all the steams of burning sulphur; nor is any other profitable way of decomposing sulphur known, than that by burning; and in this way the most successful operators have never obtained more than 14 ounces of oil from a pound of sulphur.

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Quantity
produced
from it.

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Methods of
obviating
the difficul-
ties in this
process.

The difficulties here are, that sulphur cannot be burnt but in an open vessel; and the stream of air, which is admitted to make it burn, also carries off the acid which is emitted in the form of smoke. To avoid this, a method was contrived of burning sulphur in large glass globes, capable of containing an hog's head or more. The fume of the burning sulphur was then allowed to circulate till it condensed into an acid liquor. A greater difficulty, however, occurs here; for though the sulphur burns very well, its steams will never condense. It has been said, that the condensation is promoted by keeping some warm water continually smoking in the bottom of the globe; and even Dr Lewis has asserted this: but the steam of warm water immediately extinguishes sulphur, as we have often experienced; neither does the fume of burning sulphur seem at all inclinable to join with water, even when forced into contact with it. As it arises from the sulphur, it contains a quantity of phlogiston, which in a great measure keeps it from uniting with water; and the desideratum is not something to make the sulphur burn freely, but to deprive the fumes of the phlogiston they contain, and render them miscible with water. For this purpose nitre has been advantageously used. This consumes a very large quantity of the phlogiston contained in sulphur, and renders the acid easily condensable: but it is plain that few of the fumes, comparatively speaking, are thus deprived of the inflammable principle; for the vessel in which the sulphur and nitre are burnt, remains filled with a volatile and most suffocating fume, which extinguishes flame, and issues in such quantity as to render it highly dangerous to stay near the place. It has been thought that nitre contributes to the burning of the sulphur in close vessels; but this too is a mistake. More sulphur may be burnt in an oil of vitriol globe without nitre than with it, as we have often experienced; for the acid of the sulphur unites with the alkaline basis of the nitre, and forms therewith an unflammable compound, which soon extinguishes the flame, and even prevents a part of the sulphur from being burnt either at that time or any other.

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Efferve-
scence be-
tween the
nitrous and
sulphureous
fumes.

In the condensation of the fumes of sulphur by means of nitre, a remarkable effervescence happens, which naturally leads us to think that the condensation is produced by some struggle between the vitriolic and nitrous acids.—Dr Lewis is of opinion that the acid thus obtained is perfectly free from an admixture of the nitrous acid: but in this he is certainly mistaken; for, on rectifying the acid produced by sulphur and nitre, the first fumes that come over are red, after which they change their colour to white. How the nitrous acid should exist in the liquor, indeed, does not appear; for this acid is totally destructible by deflagra-

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tion with charcoal: but it does not follow, that because the nitrous acid is destroyed when deflagrated with charcoal, that it must likewise be so if deflagrated with sulphur. Indeed, it certainly is not; for the clystus of nitre made with sulphur, is very different from that made with charcoal. (See *Nitrous Acid decomposed by Charcoal*, below). This is not the only instance in which we must not reason too close from analogy.

The proportions of nitre to the sulphur, used in the large oil of vitriol works are not known, every thing being kept as secret as possible by the proprietors. Dr Lewis reckons about six pounds of nitre to an hundred weight of sulphur; but from such experiments as we have made, this appears by far too little. An ounce and an half, or two ounces, may be advantageously used to a pound of sulphur. In greater proportions, nitre seems prejudicial.

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Lead ves-
sel, an im-
provement.

A very great improvement in the apparatus for making oil of vitriol, lies in the using lead vessels instead of glass globes. The globes are so apt to be broken by accident, or by the action of the acid upon them, that common prudence would suggest the use of lead to those who intend to prepare any quantity of vitriolic acid, as it is known to have so little effect upon the metal. The leaden vessels, according to the best accounts we have been able to procure, are cubes of about three feet, having on one side a door about six inches wide. The mixture of sulphur and nitre is placed in the hollow of the cube, in an earthen saucer, set on a stand made of the same materials. The quantity which can be consumed at once in such a vessel is about two ounces. To prevent the remains from sticking to the saucer, it is laid on a square bit of brown paper. The sulphur being blinded, the door is to be close shut, and the whole let alone for two hours. In that time the fumes will be condensed. The door is then to be opened; and the operator must immediately retire, to escape the suffocating fumes which issue from the vessel. It will be an hour before he can safely return, and introduce another quantity of materials, which are to be treated precisely in the same manner.

Where oil of vitriol is made in large quantities, the slowness of the operation requires a great number of globes, and constant attendance day and night. Hence the making of this acid is very expensive, and none but men of fortune need attempt it. The apparatus usually costs L. 1500.

Vitriolic Acid combined with fixed Alkali.

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Vitriolated
tartar.

Dilute a pound of oil of vitriol with ten times its quantity of water; dissolve also two pounds of fixed alkaline salt in ten pounds of water, and filter the solution. Drop the alkali into the acid, as long as any effervescence arises; managing matters so, that the acid may prevail. The liquor will now be a solution of the neutral salt called *vitriolated tartar*, which may be procured in a dry form, either by exsiccation or crystallization. In case the later method is made use of, some more alkali must be added when it is set to evaporate, for this salt crystallizes best in an alkaline liquor. See n^o 74.

Concerning the preparation of this salt, Neuman
10 Z relates

PRACTICE relates several experiments which seem to have been very inaccurately made; and many circumstances which we are assured, from later discoveries, cannot possibly be true. "I prepared," says he, "a caustic alkali, by mixing one ounce of pure alkaline salt with two ounces of quicklime; boiling the mixture in fresh parcels of water till the liquor no longer acquired any saline taste; then filtering the several decoctions, and evaporating them to dryness. The dry salt weighed two scruples and an half more than the alkali employed; and the remaining lime weighed a drachm less than at first."

Here, we are sure, that he must have been mistaken; for as a pure alkali loses weight by being deprived of its fixed air, so the quicklime gains by being combined with the fixed air which the alkali loses; but Neuman's account would cause us believe, that the contrary took place.—He further takes notice, that having added by degrees two drachms of spirit (probably the oil) of vitriol, to one of the caustic alkali, a perfect saturation took place. During the effervescence a bright brownish earth fell to the bottom, which weighed, when dry, three grains. The filtered liquor deposited in evaporation first five grains and an half of white earthy creme, and afterwards five grains of a yellowish one. The dried salt weighed only two scruples and eight grains. During the saturation an abominable urinous smell arose, from which the exsiccated salt was not wholly free.

On this experiment we may observe, in the first place, that if the alkali had been perfectly caustic, little or no effervescence would have taken place. (See A18). If the spirit of vitriol was highly rectified, the quantity was by far too great for the alkali. If it was not rectified, there can be no judgment formed concerning the experiment. The quantity of salt left, too, is much less than it ought to have been; for the vitriolic acid adds greatly to the weight of those substances which it unites with. The urinous smell is totally unaccountable. Several other strange appearances are mentioned by this author, on trial of mild alkalies, and differences which happened on mixing the acid with the alkali, or the alkali with the acid; but all of them have so much the appearance of inaccuracy, that they can by no means be depended on.

Other methods, besides that above described, have been recommended for preparing vitriolated tartar; particularly that of using green vitriol instead of the pure vitriolic acid. In this case the vitriol is decomposed by the fixed alkali; but as the alkali itself dissolves the calx of iron after it is precipitated, it is next to impossible to procure a pure salt by such a process; neither is there occasion to be solicitous about the preparation of this salt by itself, as the materials for it are left in greater quantity than will ever be demanded, after the distillation of spirit of nitre.

Vitriolated tartar is employed in medicine as a purgative; but is not at all superior to other salts which are more easily prepared in a crystalline form. It is very difficultly soluble in water, from which proceeds the difficulty of preparing it in a crystalline form; for if the acid and alkali are not very much diluted, the salt will be precipitated in powder, during the time of saturation.—It is very difficult of fusion, requiring

a strong red heat; but, notwithstanding its fixedness in a violent fire, it arises with the steam of boiling water in such a manner as to be almost totally dissipated along with it by strong boiling.—This salt has been used in making glass; but with little success, as the glass wherein it is an ingredient always proves very brittle and apt to crack of itself.

If, instead of the vegetable fixed alkali, the vitriolic acid is saturated with the fustile one called the *salt of Soda*, a kind of neutral salt will be produced, having very different properties from the vitriolated tartar. This compound is called *Glauber's salt*. It dissolves easily in water, shoots into long and beautiful crystals, which contain a large quantity of water, in consequence of which they undergo the aqueous fusion when exposed to heat. They are also more easily fusible than vitriolated tartar.—This kind of salt was formerly much recommended as a purgative, and from its manifold virtues was intitled by its inventor *sal mirabile*. It is, however, found to possess no virtue different from that of other purgative salts; and its use is, in many places, entirely superseded by a salt prepared from the *bitters*, or liquor which remains after the crystallization of sea-salt, which shall be afterwards described.

Vitriolic Acid combined with Volatile Alkali.

Take any quantity of volatile alkaline spirit; that prepared with quicklime is preferable to the other, on account of its railing no effervescence. Drop into this liquor, contained in a bottle, diluted oil of vitriol, shaking the bottle after every addition. The saturation is known to be complete by the volatile smell of the alkali being entirely destroyed. When this happens, some more of the spirit must be added, that the alkali may predominate a little, because the excess will fly off during the evaporation. The liquor, on being filtered and evaporated, will shoot into fine fibrous plates like feathers. This salt, when newly prepared, has a sulphureous smell, and a penetrating pungent taste. It readily dissolves in water, and increases the coldness of the liquor; on standing for a little time, it begins to separate from the water, and vegetate, or arise in efflorescences up the sides of the glass. It easily melts in the fire; penetrates the common crucibles; and if sublimed in glass vessels, which requires a very considerable heat, it always becomes acid, however exactly the saturation was performed.

This salt has been dignified with the names of *Glauber's secret sal ammoniac*, or *philosophic sal ammoniac*, from the high opinion which some chemists have entertained of its activity upon metals; but from Mr Pott's experiments, it appears, that its effects have been greatly exaggerated. It dissolves or corrodes in some degree all those metals which oil of vitriol dissolves, but has no effect upon those on which that acid does not act by itself.

Gold is not touched in the least, either by the salt in fusion, or by a solution of it: the salt added to a solution of gold in aqua regia occasions no precipitation or change of colour. On melting the salts with inflammable matters, it forms a sulphureous compound, which dissolves gold in fusion, in the same manner as compositions of sulphur and fixed alkaline salt. Melt-
ed

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Different
methods of
preparing
vitriolated
tartar.

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Uses.

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tions.

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ments.

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Glauber's
salt.

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Glauber's
secret sal
ammoniac.

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Properties
of the salts.

PRACTICE ed with silver, it corrodes it into a white calx, which partially dissolves in water: it likewise precipitates silver from its solution in aqua fortis. It acts more powerfully on copper; elevates a part of the metal in sublimation, so as to acquire a bluish colour on the surface; and renders the greatest part of the residuum soluble in water. This solution appears colourless, so that it could not be supposed to hold any copper; but readily discovers that it abounds with that metal, by the blue colour it acquires on an addition of volatile alkali, and the green calx which fixed alkalies precipitate. In evaporation it becomes green without addition. Iron is corroded by this salt in fusion, and dissolved by boiling in a solution of it. Zinc dissolves more freely and more plentifully. Lead unites with it, but does not become soluble in water. Tin is corroded, and a part of the calx is soluble in boiling water. Of regulus of antimony, also, a small portion is made soluble. Alkalies precipitate from the solution a bluish powder. Calcined bismuth-ore treated with its equal weight of the salt, partly dissolved in water into a pale red liquor, which became green from heat, in the same manner as tinctures made from that ore by aqua regia. The undissolved part yielded still with fritt, a blue glass. On treating manganese in the same manner, aluminous crystals were obtained: the undissolved part of the manganese gave still a violet colour to glasses.

Vitriolic Acid combined with Calcareous Earth.

This combination may be made by saturating diluted oil of vitriol with chalk in fine powder. The mixture ought to be made in a glass; the chalk must be mixed with a pretty large quantity of water, and the acid dropped into it. The glass must be well shaken after every addition, and the mixture ought rather to be over saturated with acid; because the superfluous quantity may afterwards be washed off; the *scilicet*, as it is called, or *gypsum*, having very little solubility in water.

This combination of vitriolic acid with chalk or calcareous earth, is found naturally in such plenty, that it is seldom or never made, unless for experiments sake, or by accident. Mr Pott indeed says, that he found some slight differences between the natural and artificial gypsum, but that the former had all the essential properties of the latter.

The natural gypsums are found in hard, semitransparent masses, commonly called *alabaster*, or *plaster of Paris*. (See ALABASTER, GYPSUM, and PLASTER). By exposure to a moderate heat, they become opaque, and very friable. If they are now reduced to fine powder, and mixed with water, they may be cast into moulds of any shape; they very soon harden without shrinking; and are the materials wherof the common white images are made. This property belongs likewise to the artificial gypsum, if moderately calcined.

Mr Beaumé has observed, that gypsum may be dissolved in some measure by acids; but is afterwards separable by crystallization in the same state in which it was before solution, without retaining any part of the acids. This compound, if long exposed to a pretty strong heat, loses great part of its acid, and is con-

verted into quicklime. In close vessels, it gives over no acid with the most violent heat. It may be fused by suddenly applying a very violent heat. With clay it soon melts, as we have observed when speaking of the materials for making crucibles. A like fusion takes place when pure calcareous earth is mixed with clay; but gypsum bubbles and swells much more in fusion with clay than calcareous earth.

From natural gypsum we see that vitriolated tartar may be made, in a manner similar to its preparation from green vitriol. If fixed alkaline salt is boiled with any quantity of gypsum, the earth of the latter will be precipitated, and the acid united with the alkali. If a mild volatile alkali is poured on gypsum contained in a glass, and the mixture frequently shaken, the gypsum will in like manner be decomposed, and a *philosophic* sal ammoniac will be formed. With the caustic volatile alkali, or that made with quicklime, no decomposition enfues.

Vitriolic Acid combined with Argillaceous Earth.

The produce of this combination is *alum*; the nature of which was long unknown, but has been discovered by Messrs Geoffroy and Boulduc, to be the acid of vitriol imperfectly saturated with argillaceous earth. Whether the earth of alum pre-existed in the clay, having the same nature as afterwards in the salt of alum, the above-mentioned gentlemen did not determine. Dr Lewis has made some experiments on this subject, and is of opinion that some change is made upon the earth during the operation. His process is as follows. "Powdered tobacco-pipe clay being boiled in a considerable quantity of oil of vitriol, and the fire continued to dryness, the matter, examined when grown cold, discovers very little taste, or only a slight acidulous one. On exposure to the air for a few days, the greatest part of it was changed into lanuginous efflorescences, in taste exactly like alum. The remainder treated with fresh oil of vitriol in the same manner, exhibits the same phenomena, and this repeatedly, till nearly the whole of the clay is converted into an astringent salt."

Alum is never prepared for the purposes of trade by the above process; the materials for it are found in different places, and the method of extracting the alum differs according to the nature of these materials. Different kinds of it are known, under the names of *rock-alum*, *plume-alum*, &c.

That called *rock-alum* is usually of a reddish colour; and consequently seems impure, as containing a little vitriolic matter. It is nevertheless preferred, and sold at a higher price than the purer kinds. This seems to be the kind called by the author of the Chemical Dictionary *Roman alum*. He says, that on trial it was found perfectly free from any admixture of vitriolic matter; though it is difficult to account for its redness on this supposition.

This kind of alum is prepared in the territory of Civita Vecchia, about 14 leagues from Rome. It is prepared in produced from a hard stone which is found there, and is neither pyritous nor calcareous. It is calcined for 12 or 14 hours, after being broken in pieces. When thus calcined, it is laid in heaps upon places surrounded by ditches filled with water. It is sprinkled with this

PRACTICE water three or four times each day, for 40 days, or till the calcined stone is covered with a reddish efflorescence. Then the stones are boiled with water in caldrons to dissolve all the alum which is formed, and the water is evaporated to the point of crystallization. This water is made to flow quite hot into oaken vessels; where, by cooling, a great quantity of irregular crystals are formed, having a pale reddish tinge.

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In Sweden. In Sweden is found a kind of mineral which yields sulphur, vitriol, and alum. This mineral appears to be a kind of pyrites. The sulphur is first extracted by distillation; the residuum, strongly calcined, is boiled in water, and the vitriol crystallized. What remains, being treated with urine, and a ley drawn from ashes, yields alum.

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In England. In England, alum is prepared from certain black laminated argillaceous strata. Sometimes these require calcination, and at others only to be exposed to the open air, when they fall into powder in the same manner as the pyrites from which copperas is made.

The mineral, when sufficiently impregnated with alum, is boiled with water; the liquor boiled down, commonly with an addition of urine or alkaline ley, or both together. The clear part is poured off and set to shoot; the crystals, if not sufficiently pure, are dissolved again, boiled down with a little more alkali, and crystallized afresh.

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Aluminous materials at Solfatara in Italy. Some earths have a manifestly aluminous taste when newly dug; and hence are directly boiled, without any previous preparation. Of this kind is the earth found at Solfatara in Italy, where large quantities of sulphur are also made. The author of the Chemical Dictionary says that this earth very much resembles the marble found in the same plain, but differs essentially from it in not effervescing with the nitrous acid.

Caldrons of lead, two feet and an half in diameter, and as much in depth, are filled with this earth or stone, to three quarters of their contents. These caldrons are sunk so as to be almost on a level with the ground, under a great sled, at the distance of about 400 paces from the sulphur furnaces. Water is thrown into each caldron till it rises three or four inches above the earth. The natural warmth of the ground is here sufficient to heat the matter, being upwards of 100° of Fahrenheit's thermometer. By this means fuel is spared; and the salt shoots in large crystals on the surface, as the water evaporates. The alum in this state, being mixed with many impurities, is carried to a building at the entry into Solfatara, where it is dissolved in a great stone-vessel shaped like a funnel. The alum is there crystallized again by the heat only of the ground, and becomes purer.

135
Near York. The alum flats, near York in England, are considerably sulphureous, and therefore require calcination to make them become aluminous. The reason of this is, that, during the calcination, the phlogiston is separated from the sulphur, and its acid combines with the aluminous earth. Long exposure to the air produces the same effect.

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Crystallization. Alum is usually crystallized in large, strong, wooden casks; whose staves and hoops are all marked with numbers, that they may readily be put together. The liquor is either boiled down greatly beyond the crystallizing point, that so it may all congeal into one

PRACTICE lump when cold, or the crystals are taken out of the casks; and as they are capable of undergoing the aqueous fusion, they are by this means all cast into lumps. It is absolutely certain, that the huge masses in which alum is sold, can never be the effect of regular crystallization.

Plume alum is sometimes found native, and crystallized like feathers, in grottos through which aluminous waters pass. From Dr Lewis's experiment with tobacco-pipe clay, it appears that this kind is easily prepared. It is rarely found native, and is not used in commerce. The name of *plume alum* has been improperly given to other matters, such as a kind of asbestos; and by some alchemists to a compound formed of arsenic and vitriolic acid.

One remarkable circumstance attends the crystallization of alum, namely, that good crystals of it cannot be formed without the addition of an alkaline lixivium, or urine, to the liquor when set to crystallize. It was supposed, that, by adding these matters, some metallic or impure earthy substance, which prevented the crystallization, was precipitated; but Mr Margraaf found by experiments, that he could not form good crystals by combining vitriolic acid with earth of alum, with calcined alum, or with clay, unless he added a lixivium of fixed or volatile alkali, or urine. As the Roman alum is the only kind which is not prepared with these additions, it may possibly derive its superiority over other kinds of this salt from its want of such substances.

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Solubility. Alum has an austere, sweetish, and strongly astringent taste. It is soluble, according to Neuman, in 10 times, according to others in 14 times its quantity of water. It dissolves in much greater quantity in hot than cold water. When evaporated to the crystallizing point, and slowly cooled, the greatest part of its crystals are found to be triangular pyramids, whose four angles seem cut off. It retains half its weight of water in crystallizing. When exposed to a moderate fire, it melts, bubbles, and swells up; and is gradually changed into a light, white, and spongy mass, called *calcined* or *burnt alum*. After evaporation, it may be again dissolved and crystallized as before.

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Decomposition. This salt is very easily decomposed; and, according to the different substances made use of for this purpose, we may produce different compounds. From alum may be prepared a vitriolated tartar; a philosophic sal ammoniac, or gypsum, according as we use a fixed alkali, a volatile one, or a calcareous earth, for its decomposition. The last will as effectually and readily decompose alum, as fixed alkali itself. Nor is there any difference between the mild and caustic alkalies with regard to this salt, the latter decomposing it as readily as the first. Neither are these the only substances capable of decomposing alum. Iron itself, which has generally much less attraction for acids than earthy substances, will decompose it, and thus form a green vitriol or copperas.

Though the vitriolic acid, however, has so little attraction for the earthy basis of alum when in a moist state, it is obstinately retained by it when heated, neither is it possible to distil the acid from alum, as from vitriol. Mr Geoffroy put five pounds of calcined alum into an earthen retort, and exposed it to a most violent fire for six days and six nights, during which time he obtained only 3 ounces of vitriolic acid.

Alum

PRACTICE Alum is very much used in dyeing, and the preparations of some colours. It is likewise used in medicine as a styptic.

per with sulphur; and upon slowly burning the sulphur, its acid corrodes the copper. The metal is then to be boiled in water, that the saline part may be dissolved. The operation is to be repeated, till all the copper is consumed; and all the saline liquors are to be evaporated together to the crystallizing point. By this method, however, a great part of the acid is lost; and in Britain, where the sulphur must be imported, we should think the pure acid preferable for those who prepare blue vitriol.

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Epsom salt.

Vitriolic Acid combined with *Magnesia*.
The earthy substance called *magnesia alba* is never found by itself, and consequently this combination cannot originally take place by art. The vitriolic acid, however, is found combined with magnesia in great plenty in the bitter liquor which remains after the crystallization of common salt, from whence the magnesia is procured by precipitating with a fixed alkali. If this liquor, which, when the common salt is extracted, appears like clear oil of vitriol, is set by for some time in a leaden vessel, a large quantity of salt shoots, very much resembling Glauber's salt mirabile. This salt is in many places sold instead of the true Glauber's salt; and is preferred to it, because the true salt mirabile calcines in dry air, which the spurious kind does not. If after the first crystallization of the bitter, the remainder is gently evaporated farther, a fresh quantity of Glauber's salt will shoot; and if the liquor is then hastily evaporated, a salt will still be crystallized; but, instead of large regular crystals, it will congregate into very small ones, having something of the appearance of snow, when taken out of the liquid. These salts are essentially the same, and are all used in medicine as purgatives. The salt shot into small crystals is termed *Epsom salt*, from its being first produced from the purging waters at Epsom in England. The bitter affording this kind of salt in such great plenty, these waters were soon neglected, as they yielded it but very sparingly, and the quantity prepared from them was insufficient for the demand. Neuman says, that having inspissated 100 quarts of Epsom water, he scarce obtained half an ounce of saline matter.

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Phenomena on distillation.

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Uiles.

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Iron.

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Salt of steel.

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Precipitation of iron from the vitriolic acid.

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Silver.

Combinations of Vitriolic Acid with Metals.

1. *Silver*. Oil of vitriol boiled on half its weight of silver filings, corrodes them into a saline mass. This substance is not used in medicine, nor in the arts. The only remarkable property of it is, that it has a very strong attraction for mercury; coagulating and hardening as much quicksilver as the acid weighed at first. If the hard concrete be diluted with fresh acid, it melts easily in the fire, and does not part with the mercury in the greatest heat that glass vessels can sustain. The vitriolic acid, by itself, strongly retains mercury, but not near so much as when combined with silver.

Silver thus corroded by the vitriolic acid, or precipitated by it from the nitrous, may in great part be dissolved, by cautiously applying a very little water at a time; and more effectually by boiling in fresh oil of vitriol.

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Copper.

2. *Copper*. With this metal the vitriolic acid cannot be combined, unless in its concentrated state, and strongly heated. If pure oil of vitriol is boiled on copper filings, or small pieces of the metal, it dissolves it into a liquor of a deep blue colour, which easily crystallizes. The crystals are of a beautiful blue colour, and are sold under the name of *blue vitriol*, or *Roman vitriol*.

142
Blue vitriol, how made. Roman vitriol is found in great plenty, however, where sulphur is made by stratifying thin plates of cop-

per with sulphur; and upon exposing to the fire, first turns white, then of a yellowish red colour. On urging it with a strong fire, the acid slowly exhales, and a dark red calx of copper remains. The whole of the vitriolic acid cannot be expelled from copper by heat: as much of it still remains as to render a part of the metal soluble in water. After this soluble part has been extracted, a little acid is still retained, amounting to about $\frac{1}{2}$ of the calx.

Vitriol of copper is employed in medicine as a caustic, in which respect it is very useful; but when used internally, is dangerous, as indeed all the preparations of copper are found to be. It has, nevertheless, according to Neuman, been recommended in all kinds of intermittents, and the lepra. The smallest portion, he says, occasions a sickness and nausea; a somewhat larger, reaching and violent vomitings, accompanied often with convulsions. If the quantity taken has been considerable, and is not soon discharged by vomiting, the stomach and intestines are corroded, intense pains, inflammations, and death, succeed.

3. *Iron*. The vitriolic acid does not act upon this metal till considerably diluted. Common oil of vitriol requires to be mixed with ten or twelve times its quantity of water, before it will act briskly on the metal. In this state it effervesces violently with iron filings, or small bits of the metal, and a great quantity of inflammable vapour is discharged. (See *ATR.*) The liquor assumes a fine green colour; and, by evaporation and slow cooling, very beautiful rhomboidal crystals are formed. These are named *salt of steel*, and are used in medicine; but, for the salt made with the pure acid and iron, the common copperas, made with the impure acid extracted from pyrites, is commonly substituted. (See *Vitriolic Acid extracted from Pyrites*, above, n° 110.) This is generally esteemed a venial fraud, and no doubt is so in medicinal respects; but when it is considered, that, by this substitution, common copperas is imposed on the ignorant, at the price of 2 s. per pound, the affair appears in a different light.

Pure vitriol of iron is originally of a much more beautiful appearance than common copperas, and retains its colour much better; the reason of which seems to be, that the salt thus prepared is more free from phlogistic matters than the copperas. If either of the kinds, however, are exposed to the air for a sufficient length of time, part of the acid is dissipated, and the vitriol becomes yellowish or brownish. If the salt is now dissolved in water, a brown precipitate falls, which is part of the iron in a calcined state. If the liquor is separated from this precipitate by filtration, a similar one forms in a short time, and by long standing a considerable quantity subsides. According to Dr Lewis, the precipitation is greatly expedited

by

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by a boiling heat; by which more of the metal separates in a few minutes, than by standing without heat for a twelvemonth. This change takes place in no other metallic solutions.

148
Yellow for
house paint-
ing.

149
Preserva-
tive for
wood.

The calx of iron, precipitated by quicklime from green vitriol, appears, when dry, of a yellow colour; and is recommended, in the Swedish transactions, instead of yellow ochre, as a colour for house-painting. Solutions of green vitriol are also recommended for preserving wood, particularly the wheels of carriages, from decay. When all the pieces are fit for being joined together, they are directed to be boiled in a solution of vitriol for three or four hours; and then kept in a warm place for some days to dry. By this preparation, it is said, wood becomes so hard, that moisture cannot penetrate it; and that iron nails are not so apt to rust in this vitriolated wood as might be expected, but last as long as the wood itself.

150
Tin.

4. *Tin.* This metal cannot be dissolved in the vitriolic acid, but in the same manner as silver; namely, by boiling concentrated oil of vitriol to dryness upon filings of the metal. The saline mass may then be dissolved in water, and the solution will crystallize. The salt, however, formed by this union, is not applied to any useful purpose. A salt of tin, indeed, formed by the union of vitriolic acid with this metal, has been recommended for some medical purposes, and processes are given for it in the dispensatories; but they have never come much into practice.

151
Lead.

5. *Lead.* While lead is in its metallic state, the vitriolic acid acts very little upon it, either in a diluted, or concentrated state; but if the metal is dissolved in any other acid, and oil of vitriol added, a precipitation immediately ensues, which is occasioned by the combination of vitriolic acid with the lead. This precipitate will be more or less white, as the metal is more or less deprived of its phlogiston by calcination, before solution. If a little strong spirit of nitre is poured upon litharge, which is lead calcined to the greatest degree possible without vitrification, the acid unites itself to the metal with considerable effervescence and heat. Some water being now poured on, and the vial containing the mixture shaken, a turbid solution of the litharge is made. If a little oil of vitriol is then added, it throws down a beautifully white precipitate; and the acid of nitre, being left at liberty to act upon the remaining part of the litharge, begins a-new to dissolve it with effervescence. When it is again saturated, more oil of vitriol is to be dropped in, and a white precipitate is again thrown down. If any of the litharge is still undissolved, the nitrous acid, being set at liberty a second time, attacks it as at first; and, by continuing to add oil of vitriol, the whole of the litharge may be converted into a most beautiful and durable white. Unfortunately this colour cannot be used in oil, tho' in water it seems superior to any. If the process is well managed, an ounce of spirit of nitre may be made to convert several pounds of litharge into a white of this kind.

152
A beautiful
white co-
lour.

153
Quicksil-
ver.

6. *Quicksilver.* The dissolution of quicksilver in vitriolic acid cannot be performed but by a concentrated oil and strong boiling heat. The metal is first corroded into a white calx, which may afterwards be

easily dissolved by an addition of fresh acid. Every time it is dissolved, the mercury becomes more and more fixed and more difficult to dry. If the exsiccation and dissolution has been repeated several times, the matter becomes at last so fixed as to bear a degree of red heat. This combination is the basis of a medicine formerly of some repute, under the name of *turbith mineral*. The process for making turbith mineral is given by the author of the Chemical Dictionary as follows:

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Turbith
mineral.

"Some mercury is poured into a glass retort, and upon it an equal quantity of concentrated oil of vitriol, or more, according to the strength of the acid. These matters are to be distilled together, in the heat of a sand-bath, till nothing remains in the retort but a dry saline mass, which is a combination of the vitriolic acid and mercury. The acid which passes into the receiver is very suffocating and sulphureous; which qualities it receives from the phlogiston of the mercury. The white saline mass which is left at the bottom of the retort is to be put into a large vessel; and upon it are to be poured large quantities of hot water, at several different times. This water weakens the acid, and takes it from the mercury; which is then precipitated towards the bottom of the vessel, in form of a very shining yellow powder. The water with which it is washed, contains the acid that was united with the mercury; and likewise a little mercury, rendered soluble by means of the very large quantity of acid.

Most chemists have believed, that a portion of vitriolic acid remains united with the turbith mineral, only too little to render it soluble in water. But Mr Beaumé, having examined this matter, affirms, that turbith mineral contains no acid, when it has been sufficiently washed; and that, by frequently boiling this preparation in a large quantity of distilled water, not a vestige of acid will adhere to it."

Dr Lewis, who is of opinion that the whole of this mercurial calx is soluble in a very large quantity of water, desires the water with which it is washed to be impregnated with some alkaline salt; which makes the yield of turbith greater than when pure water is used. The author of the Chemical Dictionary also observes, that the precipitate remains white till freed from the acid; and the more perfectly it is washed, the deeper yellow colour it acquires.

155
Dr Lewis's
directions.

7. *Zinc.* This femimetal is not acted upon by the vitriolic acid in its concentrated state; but, when diluted, is dissolved by it with effervescence, and with the extrication of an inflammable vapour in the same manner as iron. Neuman observes, that, during the dissolution, a grey and blackish spongy matter fell to the bottom; but, on standing for some days, was taken up, and dissolved in the liquor, nothing being left but a little yellowish dust scarcely worth mentioning. Six parts of oil of vitriol, diluted with an equal quantity of water, dissolves one part of zinc.

156
Zinc.

The product of this combination is *white vitriol*, which is used in medicine as an ophthalmic, and in painting for making oil-colours dry quickly: what is used for this purpose, however, is not made in Britain, but comes from Germany. It is made at Goslar by the following process. An ore containing lead and silver, having been previously roasted for the obtaining

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White vi-
triol.

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taining of sulphur, (see METALLURGY), is livified with water, and afterwards evaporated in leaden boilers, as for the preparation of green vitriol: but here a regular crystallization is prevented; for when the salt has assumed any kind of crystalline form, these crystals are made to undergo the watery fusion in copper caldrons. It is then kept constantly stirring till a considerable part of the moisture is evaporated, and the matter has acquired the consistence of fine sugar. White vitriol generally contains some ferruginous matter, from which it may be entirely freed, by some fresh zinc; for this semimetal precipitates from the vitriolic acid all other metallic substances; but notwithstanding this strong attraction, the vitriolic acid is more easily expelled by distillation from white, than green, or blue vitriol. Towards the end of the distillation of white vitriol, the acid arises exceedingly concentrated, though sulphureous; so that, if mixed with common oil of vitriol, it will heat it almost as much as oil of vitriol heats water.

158
Regulus of
antimony.

8. *Regulus of Antimony.* To combine vitriolic acid with regulus of antimony, the same method must be used, as directed for uniting it with quicksilver, for making turbit mineral, viz. to employ a very concentrated acid, and to distil in close vessels. The same phenomena also occur in this case as in making turbit mineral; a very suffocating sulphureous acid rises; and, as Mr Geoffroy observes, a true sulphur sublimes into the neck of the retort; a white, saline, tumefied mass remains in the vessel; and when the vessels are unluted, a white fume issues, as in the smoking spirit of libavium. See *Combinations of marine acid with tin*, infra.

159
Regulus of
cobalt.

9. *Regulus of Cobalt.* The only accounts we have of the combination of vitriolic acid with this semimetal are, that it is slowly dissolved into a rose coloured liquor, which, in evaporation, throws off to the sides a blue powder, that on cooling grows white.

160
Arsenic.

10. *Arsenic.* Neuman relates, that powdered white arsenic being distilled in a retort with oil of vitriol, a transparent sublimate like glass arose, which in a few days lost its transparency, and became opaque like the arsenic itself. The arsenic remaining in the retort, sustained an open fire without any sensible alteration. The author of the Chemical Dictionary says, that if a concentrated vitriolic acid is distilled from arsenic, the acid which comes over smells exactly like marine acid. When the solution is distilled till no more acid rises, the retort is then almost red-hot, and no arsenic is sublimed; but it remains fused at the bottom of the retort; and, when cold, is found to be an heavy, compact mass, brittle and transparent as crystal-glass. This kind of arsenical glass, exposed to the air, soon loses its transparency from the moisture it attracts, which dissolves and partly deliquesces it. This deliquium is extremely acid.—None of the three last mentioned combinations have been found applicable to any useful purpose.

Vitriolic Acid combined with *Inflammable Substances.*

1. *Oil.* The product of this combination is a thick black substance, very much resembling balsam of sulphur in colour and consistence; to which it is sometimes substituted. If this substance is distilled with a

gentle heat, great part of the acid becomes volatile, and evaporates in white fumes, having a pungent smell resembling that of burning sulphur. This goes by the name of *volatile or sulphureous vitriolic acid*; and a salt was formerly prepared from it by saturation with fixed alkali, which was thought to possess great virtues. From its inventor it was called the *sulphureous salt of Stahl*. The most singular property of this volatile acid is, that though the vitriolic in its fixed state is capable of expelling any other acid from its basis, the volatile one is expelled by every acid, even that of vinegar. It is very difficultly condensable, as we have already taken notice; and, when mixed with water, seems scarcely at all acid, but rather to have a bitterish taste.

Several methods have been proposed for procuring this acid from burning sulphur, which yields it in its greatest degree of volatility, as well as concentration; but the produce is so exceedingly small, that none of them are worth mentioning. Dr Priestley has given very good directions for obtaining the volatile vitriolic acid in the form of air. His method was, to pour, on some oil of vitriol contained in a vial, a very small quantity of oil olive; as much as was sufficient to cover it. He then applied the proper apparatus for the reception of air in quicksilver, (see AIR); and, holding a candle to the vial, the volatile vitriolic acid rushed out in great quantity. Had he received this air in water, instead of quicksilver, the consequence would have been, that some part of it, at least, would have been absorbed by the water, and a sulphureous acid liquor produced. This seems indeed almost the only method of procuring the sulphureous vitriolic acid of any tolerable strength; but it is never required in the form of a liquor except for experimental purposes. The only useful property hitherto discovered about this kind of acid is, that it is remarkably destructive of colours of all kinds, and hence the fumes of sulphur are employed to whiten wool, &c.

2. *Phlogiston of Charcoal.* If charcoal is mixed with concentrated vitriolic acid, and the mixture distilled, the same kind of acid is at first obtained, which comes over when oil is used; and towards the end, when the matter begins to grow dry, a true sulphur sublimes. The best way, however, of producing sulphur from the vitriolic acid is by combining it, when in a perfectly dry state, with the phlogiston. By this means sulphur may very readily be made at any time. The process is generally directed to be performed in the following manner.

Reduce to fine powder any quantity of vitriolated tartar. Mingle it carefully with a 16th part of the weight of charcoal-dust. Put the whole into a covered crucible set in a melting furnace. Give a heat sufficient to melt the salt; and when thoroughly melted, pour it out on a flat stone. The vitriolated tartar and charcoal will now be converted into a sulphureous mass similar to a combination of alkaline salts with sulphur. See *Alkaline Salts*, below.

3. *Spirit of Wine.* The result of this combination is one of the extraordinary phenomena in chemistry; being that fluid, which, for its extreme degree of volatility, was first distinguished by the name of *ether*; and now, since a liquor of the like kind is discovered

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162
Volatile sulphureous acid.

163
How procured by Dr Priestley.

164
Charcoal.

165
Sulphur prepared from vitriolated tartar.

166
Spirit of wine.

167
Oil.

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to be preparable from spirit of wine by means of other acids, this species is distinguished by the name of *vitriolic ether*. The method of preparing this subtle liquor recommended by Mr Beaumé, seems to be the best of any hitherto discovered.

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Ether.

" Mix together equal parts by weight, of highly rectified spirit of wine and concentrated oil of vitriol, or somewhat more than two measures of spirit of wine with one of the acid. The mixture is to be made in a flint glass-retort, the bottom and sides of which are very thin, that it may not break from the heat which is suddenly generated by the union of these two substances. The spirit of wine is first put into the retort, and then the acid is poured in by a glass-funnel, so that the stream may be directed against the side of the glass; in which case it will not exert much of its force on the spirit, but will lie quietly below at the bottom. The retort is now to be very gently shaken, that the acid may mingle with it by little and little. When the mixture is completed, very little more heat will be necessary to make the liquor boil.

This mixture is to be distilled with as brisk and quick a heat as possible; for which reason, immediately after the acid and spirit are mixed, the retort should be put into a sand furnace, heated as much as the mixture is. The distillation should be continued only till about one-third of the liquor is come over; if it is continued farther, part of the vitriolic acid rises in a sulphureous state. In the retort a thick, black, acid matter remains, which is similar to a combination of oil of vitriol with any inflammable matter, and from which a little sulphur may be obtained. Along with the sulphureous acid, a greenish oil, called *oil of vitriol dulcis*, arises, which has a smell compounded of that of the ether and sulphureous acid: and Mr Beaumé has shewn that it is compounded of these two; for if it is rectified with an alkali, to attract the acid, it is changed into ether. If, after the distillation of the ether, some water be poured into the retort, the liquor by distillation may be brought back to the state of a pure vitriolic acid.

As the steams of the ethereal liquor are exceedingly volatile, and at the same time a quick fire is necessary to the success of the operation, the receiver must be carefully kept cool with very cold water, or with snow. Care must also be taken to prevent any of the sulphureous acid steams from coming over; but as it is impossible to prevent this totally, the liquor requires rectification. This is the more necessary, as a part of the spirit of wine always rises unchanged. From the acid the liquor is easily set free, by adding a small quantity of alkaline salt, and re-distilling with a very gentle heat; but as spirit of wine is likewise very volatile, the distillation must be performed in a very tall glass. Dr Black recommends a matras, or bolt-head, with a tin pipe adapted to the head, so as to convey the steams at a right angle, to be condensed in the receiver.

Ether is the lightest of all known fluids, except air; and is so volatile, that *in vacuo* its boiling point is 20° below 0° of Fahrenheit's thermometer. If a small quantity is poured out on the ground, it instantly evaporates, diffusing its fragrance all through the room, and scarce perceptibly moistening the place on which

it fell. It difficultly mixes with water, as being of an oily nature: ten parts of water, however, will take up one part of ether. Its great volatility renders it serviceable in nervous diseases, and removing pains, when rubbed on with the hand, and kept from evaporating immediately. By spontaneous evaporation, it produces a great degree of cold. (See EVAPORATION and CONGELATION). The most extraordinary property, however, is, that if gold is dissolved in aqua regia, (see *Metallic Substances*, below), and ether added to the solution, the gold will leave the acid and permanently unite with the ether. The exceeding great volatility of ether renders it very easily inflammable even on the approach of flame; and therefore it ought never to be distilled, or even poured from one vessel to another, by candle-light. If a less quantity of the vitriolic acid is added to the spirit of wine than what is sufficient to produce ether, the product is called *Spiritus vitrioli dulcis*.

II. Of the NITROUS ACID and its Combinations.

This acid is far from being so plentiful as the vitriolic. It has been thought to exist in the air; and Dr Priestley's experiments have indeed shewn, that a part of it enters into the composition of our atmosphere: but it is greatly to be doubted whether it can be recovered from it in its proper form; for no method of doing this has hitherto been found. Fixed alkaline salts, indeed, when exposed to the air, imbibe its fixable part, and by that means become susceptible of crystallization; which probably has given occasion to the notion that they imbibe vitriolic acid from it: but we have no experiments from which it can be inferred, either that the least portion of nitrous acid exists ready formed in the air, or that the materials for its formation are to be found there.

What has given rise to the opinion of the nitrous acid being absorbed from the atmosphere, seems to be, that some kinds of earth, the rubbish of old houses, &c. are found impregnated with this acid, on being some time exposed to the air; but we might as well make this an argument for the vitriolic acid being absorbed from the air by pyrites, when exposed to it for making green vitriol. In this last case, however, we know that there is no attraction of new acid; but only a decomposition of sulphur which contains the vitriolic acid already formed, and which then fully manifests itself. In like manner, the nitrous acid may originally lie hid in those earths which are found to contain it plentifully in exposure to the air, and only wants such an exposure to become visible.

The most probable opinion is, that the nitrous acid is only the vitriolic altered by a mixture of inflammable matter; and, in support of this, the similarity between the nitrous and sulphureous vitriolic acids is urged. Experiments are also brought in proof of this; none of them, however, seem to be decisive. In the Berlin memoirs, we have an account of some experiments made by Dr Pictets on this subject; who says, that, having soaked a calcareous stone with vitriolic acid and urine, he found it, after being some time exposed to the air, to abound greatly in nitre. Neuman says, that if two ounces of good spirit of nitre are mixed with half an ounce of oil of turpentine, the

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Doubtful whether the nitrous acid is procurable from air, in its proper form.

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Probably only the vitriolic altered.

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Properties of ether.

PRACTICE the mixture will be a true balsam of sulphur. The most remarkable experiment, however, is one by Wallerius, mentioned by Dr Lewis in his notes on Neuman's chemistry.

171 Experiment in favour of this opinion. "Some salt of tartar," says he, "being mixed with the dulcified spirit of vitriol, or perhaps with the ether, (for the author expresses himself a little ambiguously,) the full bottle stopp with a cork, tied over with bladder, and laid on its side; on standing for four months, the greatest part of the spirit was found to have escaped, and the salt was shot into hexagonal prismatic crystals resembling nitre. It tasted strongly of the spirit, but had no other particular taste. Laid on a burning coal, it crackled, exploded with a bright flash, and flew into the air. He afterwards found, that by adding to the spirit a drop or two of any acid, the salt crystallizes the sooner; and in this case it has a fourth taste, but in other respects is the same with that made without acid. This salt-petre, says the author, promises, from the violence of its explosion, to make the strongest gun-powder in the world, but a very dear one. Though the experiment should not be applicable to any use in this way, it will probably contribute to illustrate the generation of nitre; as it palpably shows nitre, that is, the acid or characteristic part of nitre, produced from the vitriolic acid and phlogiston."

172 Not conclusive. We cannot here help again regretting that chemists of superior abilities should sometimes leave very important discoveries only half finished, so that chemists of an inferior rank know not what to make of them. Had Wallerius, who seems more than once to have been in possession of this salt, only poured on it a few drops of oil of vitriol, the peculiar colour and smell of the fumes must have been a much more convincing proof of the reality of this transmutation, than that of the mere deflagration; because the latter can be otherwise accounted for.

It is certain, that many substances, water itself not excepted, will explode with great violence if suddenly heated beyond what they are able to bear. If spirit of wine is confined in a close vessel, it will also by means of heat burst it as effectually as water; and as the vapours of this substance are inflammable, the explosion will be attended with a flash, if any flame is near. In like manner, ether, on the approach of a candle, takes fire, and goes off in a flash like lightning; but this happens, not from any thing nitrous, but from its great volatility and inflammability. If therefore the vapours of the ethereal liquor are confined, and heat is applied suddenly to the containing vessel, their great volatility will cause them make an instantaneous effort against the sides of it, which, increasing with a swiftness far beyond that of aqueous or spirituous vapours, will make a much quicker as well as a much stronger explosion than either of them; and if a flaming substance is near, the explosion will be attended with a bright flash like that of the ether itself.

In the experiment now before us, the salt tasted strongly of the spirit, or ether, from which it was made. The spirit was therefore confined in the crystals of salt; and his volatile liquor, which, even under the pressure of the atmosphere, boils with the heat of 100° of Fahrenheit, was, in a confined state, subjected

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to the heat of a burning coal; that is, to more than ten times the degree of heat necessary to convert it into vapour. The consequence of this could be no other, than that the particles of salt, or perhaps the air itself, not being capable of giving way soon enough to the forcible expansion of the ether, a violent explosion would happen, and the salt be thrown about; which accordingly came to pass, and might very reasonably be expected, without any thing nitrous contained in the salt.

The accounts we have of the production of nitre itself, which is a combination of the nitrous acid and fixed alkali, generally agree pretty much in its being extracted from particular kinds of earth, or from the rubbish of old houses; but the impossibility of procuring the least quantity of nitrous salt from these substances in this country, renders the whole of such accounts justly suspected. The warmth of particular climates indeed might be very justly conjectured to be the reason why nitre should be made to advantage in some countries, and not in others; but it can scarce account for the impossibility of making a single grain in colder climates. It seems very strange, that the same means which produce great quantities of nitre in France shall produce none in Britain, though used with the utmost exactness and care.

The requisites for the production of nitre, according to Neuman, are, 1. Putrid, or putrescible matters, either of the animal or vegetable kingdom. 2. Certain earths; as lean clays, limestone, gypsum, the rubbish of old buildings, &c. And, 3. Air. The greatest quantities of salt-petre, says he, are produced from urine and dung, whose strong tendency to putrefaction renders them preferable to other matters. Human urine, the urine of sheep, goats, and horses, and the dung of pigeons, are found to answer best. The leaves, flowers, and stalks of vegetables, hay and straw, saw-dust, &c. are mixed in the composition, and contribute more or less to the effect, according to their degree of putrescibility. On these principles, says he, nitre may be produced in all countries; and in many places very advantageous works might be established, if we were better acquainted with the manner of its production.

According to this author, likewise, certain earths may be so disposed and improved, as to afford more nitre by the admixture of different substances, which may properly be called *nitrous ferments*. The following compositions are proper. 1. Lime, sheeps dung, sheeps urine, and common salt. 2. Lime, salt, rasped horns and hoofs, cuttings of leather, and other refuse of animal substances. 3. Human urine and lime. 4. Human urine, lime, salt, and pigeons dung; and other like mixtures of lime and salt with animal matters. 5. Compositions of animals and vegetables together; as bitter plants boiled in the urine, and poured on the earth. 6. Tartar, lime, and urine. 7. Lime, pressings of grapes, and the liquor of dung-hills. 8. Wine lees, dung-hill liquor, lime, and salt. 9. Tartar and lime. 10. Lime, salt, dung-hill liquor, and the matter remaining after the distillation of spirit of wine. 11. Lime, salt, urine, dung, and martial scoria.

The author of the Chemical Dictionary acquaints us, that this salt is found naturally crystallized in India, nitre.

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173 Accounts of the production of nitre, uncertain and suspicious.

174 Requisites, according to Neuman, for its production.

175 Nitrous ferments.

176 Different methods of making nitre.

PRACTICE dia, and is swept from the earths and stones which produce it; for which reason it is called salt-petre sweepings. A nitre may also be obtained from several plants. These, says he, are the only two kinds of natural nitre; all other nitre is only begun by nature, and is found in the walls of old buildings. The most favourable places for the production of nitre, are the habitations of men and animals, particularly such as are low and moist, as cellars, kitchens, stables, houses of office, and others of that kind, which are apt to be impregnated with vegetable and animal matters, and also to have an habitual moisture, which is favourable to putrefaction; and lastly, which are sheltered from rain, which might dissolve and carry off the nitre as soon as it is formed.

In the East Indies, the nitrous acid is said to be found in great plenty, mixed with some kinds of marly earths; from whence it is extracted by lixiviation with water, and precipitating the earth with a fixed alkali. An account of the method of making salt-petre in Virginia has been published by order of the society for encouraging arts, &c. This, however, gives no light as to the origin of the acid; only informing us that nitre is found in tobacco-houses, stables, cow-houses, hen and pigeon houses, and in any covered place where the influence of the sun seldom reaches. A sixty feet tobacco-house will yield 16 hundred weight yearly; and so in proportion for other houses. The directions for preparing the floors of these houses for yielding nitre, follow.

"In order to prepare the floors for attracting nitre, all dung and other trash must be removed; and if the floors are not level, they must be made so by laying on marl, or any soil not too stiff, which must be lightly trod down with the feet.

"The floor being thus prepared, sprinkle strong amber over it, made from tobacco trash; and cover it with wet ground leaves, or other tobacco trash, for a fortnight: then clean out the trash; and in any cool dry morning that succeeds, you will find on the floor, the nitre attracted and condensed like hoar-frost, which must be carefully swept off as often as that appearance is observed."

In the annual register for 1763, we meet with a paper signed J. R. the author of which relates some attempts of his own to make salt-petre, in so sensible a manner, that we cannot help giving an account of them in his own words.

"Having perused," says he, "what Hoffman, Stahl, Boerhaave, and others, have delivered on the formation of nitre; and being furnished with an account of the nitre-works near Paris, and with the method of making this salt at Calcutta, I entered upon the subject with as much assiduity and attention, as a man can apply to one he is either pleased with, or interested in. The writers above-mentioned differ so little in their accounts of the constitution of nitre, and the materials which supply it, that I shall, for brevity's sake, confine myself to what is delivered by Hoffman. He says, in the first place, that nitre has two principles, or elements; one the universal, simple, and primumogenial acid which inhabits the air, *quod ventris suo portat*; the other an alkaline, sulphureous, fat earth; and that this last is a matrix, which, by attracting to

itself and imbibing the former from the air, constitutes nitre. He further observes, that the substances which supply nitre in greatest plenty, are the rubbish of demolished houses, all kinds of earth, clay, and loam, lime, ashes, and soap-boilers dregs; and that these always produce the most nitre, in proportion as they are combined with the urine and excrements of animals, and with corrupted vegetables. All these materials I soon furnished myself with, and for greater certainty procured some of them from different places; but after frequent trials, by drenching and boiling them in water, could not procure any thing at all like nitre from them. I then provided a great number of flat glazed earthen pans; and in these exposed the same substances for several months, in a dry state, to the air; but found myself equally disappointed. I likewise placed in the same situation a quantity of the vegetable alkaline salt called *pearl-ash*, some of it alone, and some mixed with the fore-mentioned earthy substances; but to no better purpose: for which I am induced to believe, notwithstanding the authority of Hoffman, and the opinion of many concerning the residence of the nitrous acid in the air, that it is not to be found therein; and this I am the better authorized to deliver, as I never could procure, after proper trials, any vestiges of nitre from hail, snow, rain-water, or dew."

These experiments having proved totally fruitless, our author was obliged to have recourse to other sources for the nitrous acid: and the only one he could find was hard spring-water. Many of these waters do indeed contain a combination of the nitrous acid with calcareous earth; but in too small quantity to be worth extracting. The operation is very easy, consisting only in dropping into the water a solution of fixed alkaline salt, filtering the liquor, and evaporating to a sufficient degree; when crystals of true nitre will be formed. From three pounds of such water as we have tried, only 20 grains of nitre were procurable; it is probable, therefore, that in all places where this salt is found in plenty, there are some circumstances which contribute to its formation, that are either over-looked, or designedly concealed.

The distinguishing characteristic of the nitrous acid is its great disposition to unite with the phlogiston; and, when so united, first to become exceedingly volatile, and at last to be dissipated in a very white bright flame: this is called its *detonation* or *deflagration*. In the strongest state in which this acid is procurable in a liquid form, it is of a reddish yellow colour, and continually exhales in dense, red, and very noxious fumes; and in this state is called *smoking*, or, from its inventor, *Glauber's*, spirit of nitre.

To extract the Nitrous Acid by means of the *Vitriolic*.

Into a glass-retort put two pounds of good salt-petre, and pour upon it 18 ounces of concentrated oil of vitriol; set the retort in a sand heat, and lute on a large receiver with the composition recommended n° 78, for resisting acid fumes; the mixture will grow very warm, and the retort and receiver will be filled with red vapours. A small fire is then to be kindled, and cautiously raised till no more drops will fall from the nose of the retort. What comes over will be a very strong and smoking spirit of nitre.

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Attempts to
make nitre
in Britain.

178
Nitrous acid
in springs.

179
Spirit of
nitre.

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Rectifica-
tion.

In this process, the nitrous acid is generally mixed with part of the vitriolic which comes over along with it, and from which it must be freed if designed for nice purposes. This is most effectually done by distilling in it a small quantity of nitre, and re-distilling the mixture. The vitriolic acid which came over in the first distillation is kept back by the nitre in the second, combining with its alkaline basis, and expelling a proportionable quantity of the nitrons acid.

181
Different
methods of
distilling.

We have here directed the pure vitriolic acid to be used, in order to expel the nitrous one; but for this purpose any combination of the vitriolic acid with a metallic or earthy basis may be used, though not with equal advantage. If calcined vitriol is made use of, as much phlogiston is communicated by the calx of iron contained in that salt, as makes the nitrous acid exceedingly volatile, so that great part of it is lost. If calcined alum, or selenite, is made use of, the vitriolic acid in these substances immediately leaves the earth with which it was combined, in order to unite with the alkaline basis of the nitre, and expels its acid: but the moment the nitrous acid is expelled from the alkali, it combines with the earth which the vitriolic acid had left; from which it cannot be driven without a violent fire; and part of it remains obstinately fixed, so as not to be expelled by any degree of heat. Hence the produce of spirit, when nitre is distilled with such substances, always turns out considerably less than when the pure vitriolic acid is used. Alum is preferable to selenite, for the purposes of distilling spirit of nitre; because the acid does not adhere so strongly to argillaceous, as to calcareous earth.

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Uses.

Spirit of nitre is very useful in the arts of dyeing and refining, where it is known by the name of *aqua fortis*; and therefore an easy and cheap method of procuring it is a valuable piece of knowledge. Many difficulties, however, occur in this process, as well as that for the vitriolic acid. Oil of vitriol, indeed, always expels the nitrous acid with certainty; and on distilling the mixture, a spirit of nitre arises; but if a glass-retort is used for the purpose of distilling this acid, the quantity of residuum left in distillation is so great, and so insoluble in water, being no other than vitriolated tartar, that the retort must always be broke in order to get it out; and the produce of spirit will scarce afford the expence of breaking a retort. If earthen retorts are made use of, they must certainly be of that kind called stone-ware, and the price of them will be very little if at all inferior to that of glass. Iron pots are said to be made use of in the distillation of common aqua fortis in large quantities; but they have the great inconvenience of making a quantity of the acid so volatile, that it not only will not condense, but spreads its suffocating vapours all around in such a manner as to prove very dangerous to those who are near it. If an iron vessel, therefore, is thought of for the purpose of distilling aqua fortis, it will be proper at least to attempt luting over the inside with a mixture of gypseous earth and sand, to prevent as much as possible the acid from attacking the metal.

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Blue aqua
fortis.

To procure the Nitrous Acid by means of *Arsenic*.

Pulverise equal quantities of dried nitre and white

crystalline arsenic; mix them well together, and distil in a glass-retort with a fire very cautiously applied; for the arsenic acts on the nitre with such violence, and the fumes are here so volatile, that, unless great care is taken, a most dangerous explosion will almost certainly happen. As, in this case, the nitrous fumes arise in a perfectly dry state, some water must be put into the receiver, with which they may unite and condense. The aqua fortis so produced will have a blue colour, owing to the inflammable principle separated from the arsenic, by which its extreme volatility is likewise occasioned. If this blue aqua fortis is exposed to the air, its colour soon flies off.

Nitrous Acid combined with *Alkaline Salts*.

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1. *Vegetable fixed alkali*. This salt, combined with the nitrous acid to the point of saturation, regenerates nitre. It is observable, however, according to Neuman, that there is always some dissimilarity between the original, and regenerated nitre, unless quicklime is added. The regenerated salt, he says, always corrodes tin, which the original nitre does not. Boiling with quicklime deprives it of this quality, and makes it exactly the same with original nitre.

Salt-petre.

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2. *Fossil alkali*. The neutral salt arising from a combination of the nitrous acid and fossil alkali is somewhat different from common nitre; being more difficult to crystallize, inclining to deliquesce in the air, and shooting into crystals of a cubical form, whence it gets the name of *cubic nitre*. Its qualities are found somewhat inferior to the common nitre; and therefore it is never made, unless by accident, or for experiments.

Cubic nitre.

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Nitre is one of the most fusible salts. It is liquefied in a heat much less than what is necessary to make it red; and thus remain in tranquil fusion, without swelling. If nitre thus melted be left to cool and fix, whether it has been made red hot or not in the fusion, it coagulates into a white, semi-transparent, solid mass, called *mineral crystal*, having all the properties of nitre itself. By this fusion, Mr Beaumé observes that nitre loses very little, if any, of the water contained in its crystals, since the weight of mineral crystal is nearly the same with that of the nitre employed.

Fusibility.

When nitre is kept in fusion with a moderate heat, and at the same time does not touch any inflammable matter, nor even flame, it remains in that state without suffering any very sensible alteration; but if it is long kept in fusion with a strong fire, part of the acid is destroyed by the phlogiston which penetrates the crucible; and hence the nitre becomes more and more alkaline. (See n° 220.)

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Nitre is of very extensive use in different arts; being the principal ingredient in gun-powder; and serving as an excellent flux to other matters; whence its use in glass making. (See GLASS.) It is also possessed of a considerable antiseptic power; whence its use in preserving meat, to which it communicates a red colour. In medicine, nitre is used as a diuretic, sedative, and cooler; but very often fits uneasily on the stomach. The resemblance of the crystals of nitre to those of Glauber's salt has sometimes been the occasion of dangerous mistakes. Dr Alexander mentions a swelling over the whole body of a woman, occasioned

Uses.

PRACTICE by her taking a solution of nitre instead of Glauber's salt. Two mistakes of the same kind we have also known. In one an ounce, and in the other upwards of two ounces, of nitre, were swallowed. The symptoms occasioned were universal coldness and shivering, extreme debility and sickness at stomach, cold sweats, and faintings. Neither of the cases proved mortal. The cure was effected by cordials and corroborants.

188
Sal prunella.

A process has obtained a place in the dispensatories for a supposed purification of nitre, by means of flowers of brimstone. A pound of salt-petre is to be melted in a crucible, or small iron vessel; and an ounce of flowers of sulphur thrown upon it, by small quantities at a time: a violent deflagration ensues on each addition; and after the whole is put in, the salt is poured out in moulds, and then called *sal prunella*. It has been disputed whether the nitre was at all depurated by this process; Dr Lewis thinks it is not. From our own experience, however, we can affirm, that by this means a sediment falls to the bottom, which carries with it any impurities that may have been in the nitre, and leaves the fluid salt clear and transparent as water. This precipitate is probably no other than a vitriolated tartar formed by the union of the sulphurous acid and alkali of the nitre, which being less fusible than the nitre, subsides in a solid form and clarifies it.

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Nitrous ammoniac.

3. *Volatile alkali*. The nitrous acid seems peculiarly adapted to an union with volatile alkali; saturating as much, or rather more of it than the strongest vitriolic acid is capable of doing. The product is a very beautiful salt, called *volatile nitre*, or *nitrous sal ammoniac*. It very readily dissolves, not only in water, but in spirit of wine, which distinguishes it from the vitriolic, and common kind of sal ammoniac. It also requires less heat for its sublimation: indeed care must be taken not to apply too great a heat for this purpose, as the nitrous sal ammoniac has the property of deflagrating by itself without any addition of inflammable matter; and this it does more or less readily, as the volatile alkali with which it was made was more or less impure and oily.

190
Dr Ward's white drop.

The medical virtues of this kind of nitre have not been inquired into. It seems to have made the principal ingredient in the famous Dr Ward's white drop, which was celebrated as an antiscorbutic; with what justice, those who have tried it must determine. The first step towards the preparation of this medicine, was the distillation of a spirit of nitre from equal parts of nitre and green vitriol calcined to whiteness by a very gentle heat. The product, we know, must have been an aqua fortis of a quality nowise extraordinary. To sixteen ounces of this aqua fortis rectified, seven ounces of volatile sal ammoniac are to be added. The quantity of volatile alkali is insufficient to saturate so much acid; but, as far as it goes, will form nitrous sal ammoniac. To the acid, thus partly saturated, four ounces of quicksilver is to be added, of which it is to be allowed to dissolve as much as it can. The liquor now contains a solution of nitrous sal ammoniac, and of quicksilver. It is then to be evaporated to a pellicle; and as the nitrous sal ammoniac must be in greater quantity than the mercurial salt, it will at any rate crystallize first. Mr Beaumé has shown

that the crystals of one kind of salt contain none of any other, though they are both dissolved in the same liquid. The salt produced could therefore contain no mercury, except what adhered to the outside of its crystals; and this was rendered as little as possible, by carefully draining the *corrosive oil* (as it is called in the receipt) from them. The nitrous sal ammoniac now rendered almost pure, is to be dissolved in thrice its quantity of rose-water: and this solution is the famous *white drop*; a most excellent, and perhaps the greatest, antiscorbutic and purifier of the blood, (*Annual Register* for 1763). The dose of this powerful medicine was two drops in the 24 hours. Two drops of any liquid weigh about a grain. A fourth part of this, or a quarter of a grain, was nitrous sal ammoniac impregnated with an uncertain, but inconceivably little portion of mercury dissolved in the nitrous acid; and we agree with the chemist who signed the receipt, that, if proper care was taken to drain the salt, such a medicine was not dangerous.

Nitrous Acid combined with Earths.

1. *Calcareous*. The nitrous acid dissolves into a transparent colourless liquor; but for this purpose it must be very much diluted, or the solution will have a gelatinous consistence. This compound is not applicable to any useful purpose. It has a very acrid taste; and, if inspissated, attracts moisture from the air. If it is totally dried, it then resembles an earthy matter, which deflagrates very weakly. By distillation in a retort, almost all the acid may be expelled, and what little remains flies off in an open fire.

Mr Pott, who has particularly examined the combination of nitrous acid with quicklime, says that the acid suffered remarkable alterations by distillation from quicklime, and repeated combinations upon it. By these experiments he obtained a salt more sensibly susceptible of crystallization and detonation, than what can be obtained by a single combination. From his experiments it would seem, that nitrous acid, by this treatment with quicklime, was capable of being entirely decomposed.

If a solution of chalk in the nitrous acid be evaporated to dryness, and then gently calcined, it acquires the property of shining in the dark, after having been exposed to the sun's rays, or even to the light of a candle. This substance, from its inventor, is called *Baldwin's phosphorus*; or, from its being necessary to keep it in a glass hermetically sealed, *phosphorus hermeticus*. (See EARTHS.)

2. *Argillaceous earths and magnesia*.—All that is known concerning the combinations of nitrous acid with these earths is, that the first produce astringent, and the second purgative, compounds, similar to alum and Epsom salt, and which are not susceptible of crystallization.

Nitrous Acid combined with Metallic Substances.

1. *Gold*.—Till very lately, it has been the opinion of chemists, that the nitrous acid by itself was incapable of acting upon this metal.—Dr Brandt, however, produced before the Swedish academy of sciences, a solution of gold in the nitrous acid, obtained in parting, by that acid, a mixture of gold and silver.—The

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Calcareous nitre.

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Nitrous acid decomposed.

193

Phosphorus.

194

Gold.

The mixed metal was boiled with aqua fortis, in a glass body fitted with a head and receiver, the liquor poured off, and the coction repeated with fresh parcels of stronger and stronger nitrous spirits, till all the silver was judged to be extracted. The last parcel was boiled down till the matter at the bottom looked like a dry salt; on boiling this in fresh aqua fortis in close vessels, as before, a part of the gold was dissolved, and the liquor tinged yellow. But though gold is by this means truly soluble in the nitrous acid, the union is extremely slight; the gold being not only precipitated on the addition of silver, but likewise spontaneously on exposure to the air.—Dr Lewis very justly observes, that this solution may have been often made unknown to the chemists who did so; and probably occasioned the mistakes which some have fallen into, who thought that they were in possession of aqua fortis capable of transmuting silver into gold.

195
Silver.

2. *Silver*.—Pure spirit of nitre will dissolve its own weight of silver; and shoots with it into fine white crystals of a triangular form, consisting of very thin plates joined closely one upon another. These crystals are somewhat deliquescent; of an extremely bitter, pungent, and nauseous taste; and, if taken internally, are highly corrosive and poisonous. They melt in a small heat; and form, on cooling, a dark-coloured mass still more corrosive, called *lunar caustic* or *lapis infernalis*. They readily dissolve in water; and, by the assistance of warmth, in spirit of wine. In the *Actæ Nature Curiosorum*, tom. vi. there is a remarkable history of silver being volatilized by its combination with the nitrous acid. Four ounces of silver being dissolved in aqua fortis, and the solution set to distil in an earthen retort, a white transparent butter arose into the neck, and nothing remaining behind; by degrees the butter liquefied, and passed down into the phlegm in the receiver. The whole being now poured back into the retort, the silver arose again along with the acid. The volatilization being attributed to the liquor having stood in a laboratory where charcoal was bringing in, the experiment was repeated with a fresh solution of silver, and a little powdered charcoal, with the same event.

197
Colours produced by solution of silver.

Solution of silver in the nitrous acid stains hair, bones, and other solid parts of animals, and different kinds of wood, of all the intermediate shades from a light brown to a deep and lasting black. The liquors commonly sold for staining hair brown or black, are no other than solutions of silver in aqua fortis, so far diluted in water as not sensibly to corrode the hair.

It gives a permanent stain likewise to sundry stones; not only to those of the softer kind, as marble; but to some of considerable hardness, as agates and jaspers. The solution for this purpose should be fully saturated with the metal; and the stone, after the liquor has been applied, exposed for some time to the sun. M. du Fay observes, (in a paper on this subject in the French memoirs for 1728), that if the solution be repeatedly applied, it will penetrate in the whitish agate, or chalcedony, about one-twelfth of an inch; that the tincture does not prove uniform, on account of the veins in the stone; that the colours, thus communicated by art, are readily distinguishable from the natural, by disappearing on laying the stone for a

night in aqua fortis; that, on exposing it to the sun afterwards for some days, the colour returns: that the solution gave somewhat different tinctures to different stones; to oriental agate, a deeper black than to the common chalcedony; to an agate spotted with yellow, a purple; to the jade stone, a pale brownish; to the common emerald, an opake black; to common granate, a violet unequally deep; to serpentine stone, an olive; to marble, a reddish, which changed to purple, and fixed in a brown; that on slates, talcs, and amianthus, it had no effect.

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If solution of silver be diluted with pure water, a considerable quantity of pure mercury added, and the whole set by in a cold place; there will form by degrees a precipitation and crystallization resembling a little tree, with its root, trunk, and branches, called *arbor Dianæ* or the *philosophic silver tree*. Another kind of artificial vegetation may be produced by spreading a few drops of solution of silver upon a glass plate, and placing in the middle a small bit of any of the metals that precipitate silver, particularly iron. The silver quickly concretes into curious ramifications all over the plate.

199
Solution of silver decomposed.

Like other metallic solutions, this combination of the nitrous acid with silver is decomposed by fixed and volatile alkalies, calcareous earths, and several metals, (see the *Table of Affinities*); but with several peculiar circumstances attending the precipitation. With metals, the silver is readily and copiously thrown down at first, but slowly and difficultly towards the end. The menstruum generally retains some portion of the silver, as the silver almost always does of the metal which precipitated it. For recovering the silver from aqua fortis after parting, the refiners employ copper. The solution, diluted with water, is put into a copper vessel, or into a glass one with thin plates of copper, and set in a gentle warmth. The silver begins immediately to separate from the liquor in form of fine grey scales, or powder; a part of the copper being dissolved in its place, so as to tinge the fluid more or less of a bluish green colour. The plates are now and then shaken, that such part of the silver as is deposited upon them may fall off, and settle to the bottom. The digestion is continued till a fresh bright plate, kept for some time in the warm liquor, is no longer observed to contract any powdery matter on the surface; when the liquor is poured off, and the precipitate washed with fresh parcels of boiling water. It is observable, that though the acid in this process saturates itself with the copper, in proportion as it lets go the silver, yet the quantity of copper which it takes up is not near so great as that of the silver which it deposits. One drachm of copper will precipitate three of silver, and saturate all the acid that held the three drachms dissolved.

Calcareous earths, as chalk, or quicklime, throw down a part of the silver, but leave a very considerable part suspended in the liquor. If the earth be moistened with the solution into the consistence of a paste, and exposed to the sun, it changes its white colour to a dark purplish black; distinct characters may be exhibited on the matter, by intercepting a part of the sun's light by threads, slit paper, &c. placed on the outside of the glass. Culinary fire does not af-

fect

fect its colour; after the masfs have been exsiccated by this, it changes as before, on exposure to the sun.

Mild volatile alkaline spirits, added to a solution of silver precipitate, but little, and caustic volatile alkalies, none. Pure fixed alkalies, and alkalies rendered caustic by quicklime, throw down the whole. Fixed alkalies impregnated with inflammable matter by calcination with animal coals, occasion at first a considerable precipitation; but, if added to a larger quantity, take up great part of the metal again. Mr Margraff relates, that edulcorated calces of silver totally dissolve, both in a lixivium of these alkalies, and in volatile spirits; and that the marine acid precipitates the silver from the volatile, but not from the fixed, alkaline solution. Kunckel reports, that the calx precipitated by volatile spirits made with quicklime, fulminates or explodes in the fire; and that by insipidating a solution of pure silver, melting the dry residuum, pouring it on spirit of urine supersaturated with salt, and setting the mixture in a gentle warmth, a blood-red masf is produced, so tough as to admit of being wound about the fingers.

200
Copper.

3. *Copper*. The nitrous acid very readily dissolves this metal into a green-coloured and very caustic liquor. The solution, if properly evaporated, will crystallize; but the crystals are deliquescent, and therefore difficult to be preserved. The only use of this combination is for the preparation of the pigment called *verditer*. Of this there are two kinds, the blue and green. The blue is by far the brightest colour, and consequently the most valuable. It is said that this is obtained by precipitating a solution of copper by any calcareous earth; and therefore is sold by the refiners, who have large quantities of solution of copper accidentally made. The solution is said to be precipitated by chalk, or whiting; and that the precipitate is the beautiful blue colour called *verditer*.

201
Verditer.

Though this process has obtained so much credit as to be printed, and implicitly copied from one book into another, it is certain that nothing can be more false. We have dissolved copper in the nitrous, the vitriolic, the marine, and the vegetable, acids. These solutions we have precipitated with fixed alkalies, with volatile alkalies, with absorbent earths, without being able to produce any other colour than the dirty green *verditer*. We have combined the precipitates with different blues, rubbing them long with Prussian blue, with smalt, bice, &c. in different proportions, without producing the desired colour. Of these, smalt mixed with green *verditer* was found to come nearest to the colour of blue *verditer*. We have also dissolved copper in alkalies, both fixed and volatile; precipitating the solutions with acids, and endeavouring to combine them, when precipitated, with a small quantity of fixed alkali; but with no success. Blue *verditer* itself dissolves in the nitrous acid with a strong effervescence; and if precipitated from it by a fixed alkali, a volatile alkali, or an absorbent earth, is always changed into green *verditer*. This last, when pure, always dissolves without effervescence, and is precipitated unchanged.

Dr Merrit likewise takes notice of the fallacy of the receipts given for making *verditer*; and seems inclined to believe that silver is necessary to its formation, as

this colour is prepared only by the refiners; but in whatever proportion we combined solution of copper with silver, we never could produce the desired colour.

4. *Iron*. On this metal the concentrated nitrous acid acts very violently; and plentifully corrodes, but does not dissolve it; the calx falling almost as fast as dissolved; and when it is once left fall, fresh acid will not take it up again. If the acid was diluted at first, it takes up a considerable proportion, provided the metal be leisurely added. If the solution is performed with extreme slowness, the colour will be green; but, if otherwise, of a dark red. It does not crystallize; and, if insipidated to dryness, deliquesces in the air.

203
Tin.

5. *Tin*. Concentrated nitrous acid acts upon tin with great force, but only corrodes the metal into a white indissoluble masf: in order to obtain a perfect solution of tin in the nitrous acid, the metal must be put in by very little at a time, and a diluted aqua fortis made use of. This solution has been considerably used in dyeing, and is remarkable for heightening red colours of all kinds; but the solution made with aqua regis is preferable. See TIN, Sect. III.

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Lead.

6. *Lead*. Proof aqua fortis, lowered with an equal quantity of water, dissolves about half its weight of lead. On diluting the solution with a large quantity of water, it turns milky, and deposits great part of the metal. The solution shoots, upon exhaling part of the menstruum, into small pyramidal crystals with square bases, of an austere sweet taste.

In the memoirs of the French academy for 1733, there is a particular account of an experiment, in which mercury is said to have been extracted from lead by dissolving it in the nitrous acid. During the dissolution, there fell a precipitate, which is plainly proved to be mercury, and was looked upon to be one of the constituent parts of the lead separated by this simple process: it seems probable, however, that the mercury in this case had been contained in the aqua fortis; for pure lead dissolved in pure aqua fortis gives no such precipitate.

205
Quicksilver supposed to be extracted from lead.

The crystals of lead in the nitrous acid, when thrown into the fire, do not degenerate as other combinations of this acid with metallic or saline bases; but crackle violently, and fly around, with great danger to the by-standers. If they are rubbed into very fine powder, they may then be melted without any danger. By repeated dissolutions in fresh aqua fortis, they at last form a thick fluid like oil, which cannot be dried without great difficulty. This composition is not adapted to any particular use, and is a violent poison.

7. *Quicksilver*. Aqua fortis, of such a degree of strength as to take up half its weight of silver, dissolves with ease above equal its weight of mercury into a limpid liquor, intensely corrosive and poisonous, which spontaneously shoots into white crystals. These crystals, or the solution exsiccated, and moderately calcined, assume a sparkling red colour; and are used in medicine as an escharotic, under the name of red *red precipitate*. This precipitate has sometimes been given internally, it is said, in very large quantities; even a whole drachm at one dose. But this would seem incredible; and the present practice does not countenance

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Quicksilver.207
Red precipitate.

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countenance the taking of red precipitate inwardly. This solution seems to have been what gave the efficacy to Ward's white drop. See n° 190.

When red precipitate is prepared in quantity, it is proper to distil the mercurial solution; because most of the aqua fortis may then be saved. It is exceedingly pure, if by purity we mean its being free of any admixture of vitriolic or marine acids; but is considerably tainted with the inflammable principle of the mercury extricated during the dissolution. In consequence of this, it is very volatile and smoking; which has generally, though improperly, been taken as a sign of strength in the nitrous acid.

208
Bismuth.

8. *Bismuth*. This semimetal is very readily acted upon by the nitrous acid. Proof aqua fortis dissolves about half its weight of bismuth. If the metal was hastily added, the solution proves of a greenish colour; if otherwife, it is colourless and transparent. Unless the acid was diluted with about an equal quantity of water, a part of the bismuth crystallizes almost as fast as it dissolves. The metal is totally precipitated both by fixed and volatile alkalis. The last, added in greater quantities than are sufficient for precipitation, take it up again. The liquor generally appears greenish; by alternate additions of the alkaline spirit and solution, it becomes bluish, or purple. Fixed alkalis calcined with inflammable matter, likewise dissolve the bismuth after they have precipitated it.

209
Magistery
of bismuth.

The only use of this compound is for the precipitate, which is used as a cosmetic, under the name of *magistery of bismuth*. The common way of preparing this is by diluting the solution very largely with water, upon which it turns milky, and a fine white precipitate falls, which is to be well educorated with water, and is then employed as a cosmetic, both in washes and pomatums.

Concerning the preparation of this cosmetic, Neuman observes, that there are sundry variations.—“Some” says he, “take aqua regia for the menstruum; and for the precipitant a solution of sea-salt, alkalies, spirit of wine, &c. Some mix, with the solution of bismuth, a solution of benzoin in spirit of wine, and thus obtain a magistery compounded of bismuth and benzoin. Others add a solution of chalk to the metalline solution, and precipitate both together by alkalis. I have made trial with a good number of different precipitants; and found, that with common fixed alkali and caustic alkali, with watery and vinous alkaline spirits, the magistery was white, and in considerable quantity; the liquor, after the precipitation with volatile spirits, appearing blue. That oil of vitriol threw down a white precipitate very copiously: but that with spirit of salt, or spirit of vitriol, the precipitate was in very small quantity, in colour like the foregoing; distilled vinegar making no precipitation at all. Common rectified spirit of wine, and tartarized spirit, common water, and lime-water, gave white precipitates. Solutions of nitre, vitriolated tartar, sal mirabile, alum, borax, common salt, sal ammoniac, the combination of marine acid with calcareous earth, and terra solata tartari, all precipitated the bismuth white. With a solution of gold in aqua regia the magistery proved grey; with a solution of the same me-

tal in aqua regia made with spirit of salt, the precipitate was likewise grey, and in small quantity; with solution of copper in aqua fortis, white, and in very small quantity, the liquor continuing blue; with solution of vitriol of copper, white; with solution of mercury sublimata, white and plentiful; with solution of iron in aqua fortis, yellowish; with solution of lead in aqua fortis, and of sugar of lead, white; with solution of zinc in aqua fortis, there was little precipitate; and with solutions of silver, tin, regulus of antimony, and of mercury, in the same acid, none at all.”

210
Zinc.

9. *Zinc*.—Upon this semimetal, the nitrous acid acts with greater violence than any other, and will forsake any other metallic substance for it. The whole is very soon dissolved into a transparent colourless liquor. The calces or flowers of zinc, (See ZINC, Sect. III.) are likewise soluble in the nitrous acid; but neither the solution of the flowers, nor of the metal itself, has been yet found applicable to any useful purpose. Neuman remarks, that on extracting with nitrous acid the soluble parts of calamine, which is an ore of zinc, the solution, inspissated to dryness, left a reddish brown mass, which, on digestion with spirit of wine, exploded, and burst the vessel.

211
Regulus of
antimony.

10. *Regulus of Antimony*. The nitrous acid rather corrodes, than dissolves, this semimetal. The corroded powder forms a medicine formerly used under the name of *bezoar mineral*, but now disregarded. See ANTIMONY, Sect. III.

212
Regulus of
cobalt.

11. *Regulus of Cobalt*. This semimetal dissolves readily in the nitrous acid, both in its metallic form, and when reduced to a calx. The solution is of a red colour. Hence the nitrous acid furnishes means of discovering this semimetal in ores, after strong calcination; very few other calces being soluble in the nitrous acid; and those that are, not influencing the colour.

213
Regulus of
cobalt, how
discovered
in ores.

12. *Nickel*. This semimetal is easily dissolved by the nitrous acid into a deep green liquor; but neither this solution, nor indeed the semimetal of which it is made, has hitherto been found of any use.

13. *Arsenic*. This substance is readily dissolved by the nitrous acid, but the nature of the compound is not known.

Nitrous Acid combined with Inflammable Substances.

214
Oils.

1. *Expressed oils*. These, as well as all other fatty or unctuous substances, are considerably thickened and hardened by their union with the nitrous acid. There is only one preparation where this combination is applied to any use. It is the *unguentum citrinum* of the slops. This is made by adding to some quantity of melted hog's-lard, a solution of quicksilver in the nitrous acid. The acid, though in a diluted state, and combined with mercury, nevertheless acts with such force on the lard, as to render the ointment almost of the consistence of tallow.

215
Unguentum
citrinum.

2. *Vinous spirits*. If highly rectified spirit of wine and strong spirit of nitre are suddenly mixed together, the acid instantly becomes volatile, and is dissipated with great heat and effervescence, in highly noxious red fumes. If the acid is cautiously poured into the spirit, in the proportion of five, six, or even ten parts of spirit to one of acid, and the mixture distilled in a glass-

216
Spirit of
wine.

PRACTICE

217
Spiritus ni-
tri dulcis.218
Nitrous e-
ther.

glass-retort set in a water-bath, an exceedingly fragrant and volatile spirit comes over, used in medicine as a diuretic and cooler, under the name of *spiritus nitri dulcis*. This liquor is not acid; nor has what remains in the retort any more the characteristics of nitrous acid, which seems to be entirely decomposed in this process. (See the following article.)

With the nitrous acid and spirit of wine, may also be made an exceedingly volatile liquor, called *nitrous ether*, to distinguish it from the vitriolic, mentioned n° 167. The method of preparing this ether is very simple and easy, provided due precautions are observed. The best proportions of the acid and vinous spirit, are, two ounces of strong nitrous acid, and three of good rectified spirit of wine. The acid is first put into a vial; and nearly an equal bulk of water is very slowly added, that it may float as much as possible on the spirit of nitre. The spirit of wine is then to be added in the same slow and cautious manner, that it may float as much as possible on the water. The whole is placed in a vessel of cold water, and the vial not very closely stoppered. The acid gradually rises up through the water, and mingles with the spirit of wine; a gentle ebullition happens during the union, and the elastic fluid generated gets out by the stopper of the bottle. The ether is produced in full quantity in seven or eight days, and floats on the top of the mixture, from whence it is to be poured off, and rectified by distillation with a little fixed alkali.

Nitrous Acid decomposed by Phlogiston.

219
Oils fired
by spirit of
nitre.

1. *Essential oils*. If equal quantities of strong nitrous acid and oil of cloves are poured into the same vessel, the mixture instantly takes fire; both acid and oil burning with great fury till only a light spongy coal remains. Dr Lewis observes, that this experiment does not always succeed, and that there are but few oils which can be fired with certainty, without attending to a particular circumstance first discovered by M. Rouelle, and communicated in the French memoirs for the year 1747. "On letting fall into the oil equal its quantity of acid, the mixture effervesces, swells, and a light fungous coal arises: a little more of the acid poured upon this coal sets it instantly on fire: by this method almost all the distilled oils may be fired by spirit of nitre of moderate strength. Exprefsed oils also may be set on fire by a mixture of the nitrous acid and oil of vitriol; the use of which last seems to be to absorb the aqueous humidity of the nitrous, and bring it to a greater degree of concentration than it can be brought to by itself."

220
Nitre alkali-
fied.

2. *Charcoal*. By this substance, the nitrous acid cannot be conveniently decomposed, unless it is combined with an alkaline or metallic base. For the purpose of decomposing the acid, common salt-petre is most convenient. The proportions recommended by Dr Lewis for alkalinizing nitre, are four ounces of the salt, to five drachms of powdered charcoal. If these are carefully mixed, and injected by little and little into a tubulated retort made red hot, and fitted with a large receiver and a number of adopters, a violent deflagration will ensue on every addition, attended with a great quantity of air, and some vapours which will circulate for some time, and then condense in the

vessels. These vapours, when condensed, seem rather of an alkaline than acid nature. This liquor is called *clivus of nitre*. If sulphur is used instead of nitre, the *clivus* is of a different kind, consisting of a mixture of the nitrous and vitriolic acids. The residuum, when charcoal is used, is a very strong and pure alkali; with sulphur, it is vitriolated tartar.

3. *Vinous spirits*. In the process already mentioned for making *spiritus nitri dulcis*, a total decomposition of the acid seems to take place; for neither the dulcified spirit itself, nor the acid matter left in the retort, shew any signs of deflagration with inflammable matters, which is the peculiar characteristic of nitrous acid.

Mr Pott has given an analysis of the oleaginous residuum of the distillation. Distilled by a stronger fire, it gave over a yellow, acid, slightly empyreumatic spirit; which being saturated with fixed alkali, the liquor evaporated, and the dry neutral salt laid on burning coals did not deflagrate. After this spirit arose a red empyreumatic oil; and in the bottom of the retort was left a shining black mass like foot; which, burnt in a crucible, left a white, fixed, earth, convertible, by a vehement fire, into glass. Another parcel of the above residuum was evaporated to the consistence of pitch. In this state it gave a yellow tincture to spirit of wine, flamed vividly and quietly on burning coals, and at last swelled up like bitumens. Another portion was saturated with alkaline ley, with which it immediately effervesced, and then evaporated as the former. It gave, as before, a yellow colour to rectified spirit of wine, and a much deeper yellow to dulcified spirit of nitre; and in the fire discovered no footstep of detonation. Mr Macquer supposes this acid to have been not the nitrous, but the acetous, which enters into the composition of the spirit of wine; but it is impossible to account for the total disappearance of the spirit of nitre, unless on the supposition of its decomposition.

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221
Clivus of
nitre.222
Residuum
of spiritus
nitri dulcis,
analysed by
Mr Pott.

III. Of the MARINE ACID and its Combinations.

This acid is never, at least very rarely found, but in a state of saturation with the mineral alkali; in which case it forms the common salt used in food. Almost the only exception to this is human urine, and perhaps that of some other animals; for there the marine acid is found saturated, not with the mineral, but the common vegetable fixed alkali. From being found in such plenty in the waters of the ocean, it has the name of *marine acid*.

It is commonly thought that this acid is no other than the vitriolic, somehow or other disguised by the inflammable principle; to which some have added another, called by them a *mercurial earth*.

The reasons given for this supposition, however, are but very slight, consisting chiefly in the resemblance between the volatile vitriolic acid and the marine, both in the white colour of their vapours, and likewise the great volatility of both. As to the existence of that principle called a mercurial earth, it hath never been proved; and, till that time, can never be allowed to be an ingredient in the composition of any substance whatever. As we do not remember to have read of any experiments where the marine acid was directly

223
Marine a-
cid.224
Marine acid
thought to
be the same
with the vi-
triolic.

directly produced from that of vitriol, we shall content ourselves with relating one very remarkable fact, which happened to fall under our own observation.

As vitriolated tartar, or Glauber's salt, when fused with charcoal-dust, is converted into an hepar sulphuris, attempts have been made on this principle to separate the pure alkali from the residuum of Glauber's spirit of nitre and spirit of salt. In an attempt of this kind, which, by the bye, proved unsuccessful, as all others of the same kind must do, 30 or 40 pounds of the mafs for Glauber's salt were fused in a strong iron pot, with a sufficient quantity of common coal powdered and sifted. As the quantity of powdered coals was pretty large, the mafs was thereby hindered from flowing into thin fusion; and, that the whole might be perfectly alkalinized, it was frequently stirred up with an iron ladle, and kept very intensely heated for some hours. The mafs was now taken out by means of an iron ladle, and laid on a flat stone; and, as it was but half fluid, every ladleful congealed into a black irregular saline mafs, which had the appearance of a cinder; but which, however, consisted of an hepar sulphuris mixed with some coal-dust. As there was a considerable quantity of this matter, and the ladlefuls were thrown at random above one another, it so happened, that between two or three of the pieces, a kind of chimney was formed, so that there being a small draught of air through the interstices, and the masses containing a quantity of coal-dust, the internal parts were in a state of ignition, while the external were quite cold. From these ignited places, a white fume arose; which, being collected on the colder masses, assumed the form of white flowers. These were found to be genuine sal ammoniac, composed of volatile alkali, and marine acid; both of which, we have the greatest reason to think, were produced at that very time, and that a double transmutation took place; namely, of the vitriolic acid into the marine, and of the fixed alkali into the volatile. Our reasons for being of this opinion are, 1. That the matter had been subjected to such an extreme and long continued heat, that, had any sal ammoniac been pre-existent in the mixture, it must have certainly been dissipated, as this salt always sublimes with a degree of heat below ignition. 2. Though the matter was taken out of the pot of a very intense red heat, so that the saline part was evidently melted, yet no ammoniacal fume issued from it at that time, nor till the masses had been for some time exposed to the air, and were become cool, excepting only those interstices where the air kept up a burning heat, by a small draught being formed from the situation of the saline masses. 3. In those ignited places, when cool, the fixed salt was entirely decomposed, neither alkaline salt, Glauber's salt, fixed alkali, nor sulphur remaining; but the whole was consumed to a kind of ferruginous ashes. We are therefore of opinion, that the marine acid and volatile alkali are, in some cases, mere creatures of the fire, and most commonly produced at the same time, from the slow combustion of mineral substances. Hence, where heaps of hot cinders are thrown out, small quantities of the true sal ammoniac are always formed, when the ignited ones

happen to fall in such a manner as to occasion a small draught of air through them. PRACTICE

The marine acid, or spirit of salt, is weaker than either the vitriolic or nitrous; though Dr Priestley hath observed, that, when concentrated to the utmost degree, in which state it was perfectly invisible and elastic as air, it was then able to separate the nitrous acid from an alkali. In some other cases, too, it appears not only stronger than the nitrous, but even than the vitriolic, of which we shall take notice in course.

To procure the Marine Acid by means of the *Vitriolic*.

Put any quantity of sea-salt, into a tubulated glass-retort, to which a large receiver is firmly luted, having a quantity of water in it, more or less, as you want your spirit of salt to be more or less strong. Having placed your retort in a sand-bath, take of concentrated oil of vitriol half as much as you put salt into the retort. Through the aperture in the upper part of the retort, pour a small quantity of the vitriolic acid; a violent effervescence will immediately arise, and white vapours will ascend, and come over into the receiver. These vapours are the marine acid in its most concentrated state; and, as they are very greedy of moisture, they will unite with the water in a very short time, unless too much oil of vitriol is put in at once; in which case, part of them will be dissipated through the small hole in the receiver. When you perceive the first fumes condensed, add a little more oil of vitriol, taking care to stop the aperture of the retort as soon as you drop in the vitriolic acid, that the marine acid may not escape. Continue this by intervals, till your acid is all put in; and then make a very gentle fire, that the retort may be no warmer than the hand can bear. This degree of heat must be continued a long time, otherwise very much of the acid will be lost. To perform this operation perfectly, no more acid should be forced over, than what the water in the receiver can take up; and by this means the operator's patience will be rewarded with a vastly larger produce of acid than can be procured by hasty distillation. When the vapours become a little more fixed, a greater heat is necessary, but nothing equal to what the nitrous acid requires.

The marine acid cannot be procured by means of combinations of the vitriolic acid with metallic and earthy bases, as the nitrous is: for though, by means of calcined vitriol, for instance, the marine acid is effectually expelled from its alkaline basis, yet it immediately combines with the calx of iron left by the vitriolic acid, and not only adheres obstinately, but even sublimes the metal; so that what little spirit can be obtained, is never pure. This inconvenience is not so great when uncalcined copperas is made use of: for the marine acid has a very strong attraction to water; which partly dissolves its union with the metalline calx. If gypsum is used, instead of calcined vitriol, not a drop of spirit will be obtained. Alum and sal catharticus amarus answer better.

To procure the Marine Acid by means of the *Nitrous*.

Take equal quantities of sea-salt, and Glauber's spirit of nitre; put the salt into a retort, and pour on it the nitrous acid; let them stand for 10 or 12 hours; then

PRACTICE then distil with a gentle heat; an acid liquor will come over, which is a compound of the nitrous and marine acids, called *aqua regis*. When the distillation is finished, and the vessels cooled, pour back the distilled liquor on the mass which is left on the retort, and distil again; the second produce will be more of the nature of spirit of sea-salt than the former. Continue to do this, pouring the distilled liquor either on the mass left in the retort, or upon fresh sea-salt, till you observe that no nitrous acid arises. No experiments have been made on this spirit of salt, by which we can judge whether it is different from that procured by the vitriolic acid or not.

To procure the Marine Acid, by distilling Salt *per se*.

²³⁰
Spirit of salt
per se. Put into a retort any quantity of common salt which has not been dried, and distil in a sand heat, till nothing more will come over. In the receiver you will have a liquor considerably more acid than vinegar, in weight about the fourth part of the salt employed. On the dry salt left in the retort, pour some water, somewhat less in quantity than the liquor which came over. Let it stand till the salt has thoroughly imbibed the moisture, and then distil again. You will again have an acid, but weaker than the former. Repeat this six or seven times; after which you will obtain no more marine acid in this way. It has been thought that sea-salt was capable of total decomposition by means of moisture alone; but that is found to be a mistake. The reason of any acid being procurable in this way, is the impurity of the common salt, which is always mixed with a quantity of sal catharticus amarus, and of marine acid combined with magnesia, from which last it is separable by moisture. If a pure salt be formed by combining marine acid with salt of soda, no spirit will be obtained.

Marine Acid combined with *Alkaline Salts*.

²³¹
Sal digestivus sylvi. **I. Vegetable fixed alkali.** This combination is accidentally formed after the distillation of volatile salts, by means of salt of tartar. (See *Alkaline Salts*.) It was formerly known by the name of *sal digestivus Sylvi*; and a process for making it was inserted in the dispensaries, under the name of *spiritus salis marini coagulatus*; but as it has been found to possess no virtues superior, or even equal, to common salt, it is fallen into disuse.

The crystals of this kind of salt are not cubical, like those of common salt, but parallelopipeds, and if thrown into the fire crack and leap about with violence. They are soluble in greater quantity by hot water than cold; and therefore are crystallized by evaporating the solution to a pellicle, and then letting it cool.—It is very remarkable, that though by a direct combination of vitriolic acid with vegetable fixed alkali, the salt called *vitriolated tartar* is formed; yet, if this alkali is once saturated with spirit of salt, so as to form a *sal digestivus*, upon the decomposition of this salt by means of oil of vitriol, the residuum of the distillation will not be a vitriolated tartar, but a salt easily soluble in water, and which bears a strong resemblance to Glauber's salt. Whether, by means of spirit of sea-salt, the vegetable alkali could be converted into the

the mineral, or salt of soda, is a question well worthy **PRACTICE** of being solved.

2. Mineral alkali. This combination is the common alimentary salt, and is never made but for experiment's sake; as the marine acid cannot be had but from sea-salt. For the extraction of this salt from seawater, see the article *SALT*.

²³²
3. Volatile alkali. The produce of this combination is the common fal ammoniac, which is used in different arts, and which has the property of making tin unite very readily with iron and copper so much used by coppermiths and in the manufactory of tinned iron.

Sal ammoniac is usually sold in large semi-transparent cakes, which are again capable of being sublimed into masses of the like kind. If they are dissolved in water, the salt very easily shoots into small crystals like feathers. Exposed to a moist air, it deliquesces. It is one of the salts which produces the most cold by its solution; so as to sink the thermometer 18 or 20 degrees, or more, according to the temperature of the atmosphere. According to Mr Gellert, a solution of fal ammoniac has the property of dissolving resins. According to Neuman, the volatility of fal ammoniac is so much diminished by repeated sublimations, that at last it remains half fluid in the bottom of the subliming vessel. In its natural state, it sublimes with a degree of heat necessary to melt lead. Pott says, that a small quantity of fal ammoniac may be produced, by distilling sea-salt with charcoal, or with alum, or by distilling marine acid with Armenian bole. The same author affirms, that the inflammability of sulphur is destroyed by subliming it with twice its quantity of fal ammoniac.

²³³
How made. The method of making this salt was long unknown; and it was imported from Egypt, where it was said to be prepared by sublimation from foot alone, or from a mixture of sea-salt, urine, and foot. That it should be produced from foot alone is very improbable; and the other method, from the known principles of chemistry, is absolutely impossible. The composition of this salt, however, being once known, there remained no other desideratum than a method of procuring those component parts of fal ammoniac sufficiently cheap, so as to afford fal ammoniac made in Britain at a price equally low with what was imported. The volatile alkali is to be procured in plenty from animal substances, or from foot; and the low price of the vitriolic acid made from sulphur, affords an easy method of decomposing sea-salt, and obtaining its acid at a low rate. A fal-ammoniac work has, accordingly, been established for several years past in Edinburgh: the principal material made choice of for procuring the volatile alkali is foot; and though no persons are admitted to see the work, the large quantities of oil of vitriol brought into it, and the quantities of genuine *sal mirabile* which are there made, evidently shew that the process for making fal ammoniac also produces Glauber's salt, by the decomposition of common salt by means of vitriolic acid. The method of conducting the process is unknown; but it is plain that there can be no other difficulty than what arises from the volatility of the vapours of the alkali and of the marine acid. In the common way of distilling those substances,

PRACTICE substances, a great part of both is lost; and if it is attempted to make fal ammoniac by combining these two when distilled by the common apparatus, the produce will not pay the cost: a little ingenuity, however, will easily suggest different forms and materials for distilling-vessels by which the marine acid and volatile alkali may be united without losing a particle of either.

If a solution of vitriolic or Glauber's secret fal ammoniac is mixed with sea-salt, the vitriolic acid seizes the alkaline basis of the sea-salt, and expels the marine acid; which immediately unites with the volatile alkali left by the vitriolic acid, and forms a true fal ammoniac. If this solution is now evaporated to dryness, and the saline mafs sublimed, the fal ammoniac rises, and leaves a combination of vitriolic acid and mineral alkali at the bottom. This fixed mafs being dissolved, filtered, and evaporated, affords Glauber's salts. This has sometimes been thought a preferable method of making fal ammoniac, as the trouble of distilling the marine acid was thereby prevented; but it is found vastly inconvenient on another account, namely, that when fal ammoniac is mixed with any fixed salt, it is always more difficult of sublimation, and a part of it even remains entirely fixed, or is destroyed. The mafs of Glauber's salt also, by reason of the inflammable and oily matter contained in impure volatile alkalies, is partly changed into a sulphureous mafs, so that the solution refuse to crystallize; at least, the operation is attended with intolerable trouble.

Marine Acid combined with Earths.

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Fixed sal ammoniac. The combinations of this acid with earths of any kind have never been found applicable to any purpose, and therefore they are seldom made or inquired into. The combination with calcareous earth, is indeed pretty frequently made accidentally, in the distillation of volatile alkali from fal ammoniac by means of chalk, or quicklime. When melted in a crucible and cooled, it appears luminous when struck, and has been called *phosphorus scintillans*. See EARTHS.

Marine Acid combined with Metallic Substances.

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Solution of gold in spirit of salt. 1. *Gold.* The marine acid has no action on gold in its metallic state, in whatever manner the acid be applied; but if the metal is previously attenuated, or reduced to a calx, either by precipitation from aqua regis, or by calcination in mixture with calcinable metals, this acid will then perfectly dissolve, and keep it permanently suspended. Gold, precipitated from aqua regis by fixed alkalies, and edulcorated by repeated ablutions, may be dissolved even in a very weak spirit of salt by moderate digestion. This solution appears of the same yellow colour as that made in aqua regis; gives the same purple stain to the skin, feathers, bones, and other solid parts of animals; the same violet stain to marble; and strikes the same red colour with tin. Even when common aqua regia is made use of for the menstruum, it seems to be chiefly by the marine acid in that compound liquor that the gold is held in solution. In distillation the nitrous acid arises, and the marine acid remains combined with the gold in a blood red mafs, soluble, like most of the combinations of metallic bodies with this acid, in spirit of wine. If, towards the end of the distillation, the fire is hastily

raised, part of the gold distills in a high saffron coloured liquor; and part sublimes into the neck of the retort in clusters of long slender crystals of a deep red colour, fusible in a small heat, deliquescent in the air, and easily soluble in water. By repetitions of this process the whole of the gold may be elevated, except a small quantity of white powder whose nature is not known.—This red sublimate of gold is said to be easily fusible with the heat of one's hand, and to be shown by the Papists for the blood of St Januarius; the sublimate contained in a vial, being warmed by the hands of the priests who hold it, constitutes the miracle of that saint's blood melting on his birth-day.

2. *Silver.* Strong spirit of salt corrodes leaf-silver into a white powder, but has no effect on filings or larger masses of the metal. If applied in the form of vapour, to masses of silver, and strongly heated at the same time, it readily corrodes them. Thus, if filings, grains, or plates, of silver are mixed with about twice their weight of mercury sublimite, and exposed to a moderate fire, in a retort, or other distilling vessel, a part of the marine acid in the sublimate will be separated and unite with the silver, leaving the mercury to arise in the form of mercurius dulcis. Marine acid is commonly supposed to be incapable of dissolving silver into a liquid state; but Henckel relates, that if red silver ore, which consists of silver intimately mixed with red arsenic, be digested in spirit of salt, the silver will be extracted and kept permanently dissolved.

The combination of marine acid with silver is called *Luna cornea*. The most ready way of preparing it is, by dissolving silver in the nitrous acid, and then adding spirit of salt, or a solution of sea-salt; when a precipitation instantly ensues; the marine acid expels the nitrous, and, uniting with the silver, falls to the bottom in form of a white powder. The same precipitation would take place, if a solution of silver was made in the vitriolic acid. See n° 32.

Luna cornea weighs one-fourth more than the silver employed; yet, when perfectly washed, it is quite insipid to the taste. It does not dissolve in water, spirit of wine, aqua fortis, or aqua regis; but is in some small degree acted upon by the vitriolic acid. It melts in the fire as soon as it grows red-hot; and, on cooling, forms a ponderous brownish mafs, which being cast into thin plates, becomes semi-transparent, and somewhat flexible, like horn; whence its name *luna cornea*. A stronger fire does not expel the acid from the metal, the whole concrete either subliming entire, or passing through the crucible. It totally dissolves in volatile alkaline spirits without any separation of the metal. Exposed to the fire in a close copper vessel, it penetrates the copper, and tinges it throughout of a silver colour. Kunckel observes, that when carefully prepared, melted in a glass vessel, and suffered to cool slowly, to prevent its cracking, it proves clear and transparent; and may be turned upon a lathe, and formed into elegant figures. He supposes this to be the preparation which gave rise to the notion of malleable glass.

3. *Copper.* In the marine acid, copper dissolves but slowly. The solution, if made without heat, appears at first brown; but, on standing for some time, deposits a white sediment, and becomes green. On adding fresh

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Blood of St Januarius.

238
Silver.

239
Luna cornea.

240
Its properties.

241
Copper.

PRACTICE copper, it becomes brown again, and now recovers its greenness more slowly than before. The white sediment, on being barely melted, proves pure and perfect copper of the same colour as at first. Copper calcined by fire, communicates a reddish colour to this acid.

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Iron.

4. *Iron.* The marine acid acts upon iron less vehemently than the nitrous, and does not dissolve so much; nevertheless it attacks the metal briskly, so as to raise considerable heat and effervescence, and dissolve it into a yellow liquor. During the solution, an inflammable vapour arises as in the solution of this metal by vitriolic acid. This solution of iron does not crystallize. If it is evaporated, it leaves a greenish saline mass, which is soluble in spirit of wine, and runs in the air into an astringent yellow liquor. If this solution of iron is distilled, some of the acid separates, and towards the end of the distillation the spirit becomes yellow. This is followed by a yellowish, or deep reddish sublimate, which glitters like the scales of fishes; leaving behind a substance which consists of thin, glossy plates, like talc.

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Iron volatilized.

The solution of iron in spirit of salt, with the addition of some spirit of wine, is used in medicine as a corroborant, under the name of *tinctura martis*. The sublimate of iron is also used for the same purpose, and called *ens veneris*, or *flores martiales*. It is commonly directed to be prepared by subliming iron filings and sal ammoniac together. In the process, the sal ammoniac is partly decomposed, and a caustic alkaline liquor distils. Then the undecomposed sal ammoniac, and the martial sublimate above mentioned, arise together. The sublimate has a deeper or lighter yellow colour, according as it contains more or less sal ammoniac. The name *ens veneris* is improper. It was given by Mr Boyle, who discovered this medicine. He imagined it to be a preparation of copper, having made use of a colcothar of vitriol containing both iron and copper.

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Tinctura martis.

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Flores martiales.

5. *Tin.* Though the concentrated marine acid has a greater attraction for tin than any other acid, it does not readily dissolve this metal while the acid is in its liquid state; but may be made to dissolve it perfectly, by the addition of a small quantity of spirit of nitre. Neuman observes, that an ounce of spirit of salt, with only a scruple of spirit of nitre, dissolved tin perfectly: but on inverting the proportions, and taking a scruple of marine acid to an ounce of the nitrous, four scruples, or four and an half, of tin, were dissolved into a thick pap; some more of the marine acid being gradually added, the whole was dissolved into a clear liquor. In making these solutions, a small quantity of black matter usually subsides.

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Solution of tin.

The solution of tin is sometimes colourless; sometimes of a bluish, or yellow colour, according to different circumstances of the process. It is of the greatest consequence in dyeing, by not only heightening the colours, but making them more durable. (See DYEING.) It shoots into small crystals; and, if inspissated, deliquesces in the air.

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Smoking liquor of Libavius.

Marine acid in its concentrated state velatizes tin, and forms with it a thick liquor, which, from its inventor, is called *smoking liquor of Libavius*. To make this smoking liquor, an amalgam (See Sect. III.) must be made of four parts of tin and five of mercury. This

amalgam is to be mixed with an equal weight of corrosive mercury, by triturating the whole together in a glass mortar. The mixture is then to be put into a glass retort, and the distillation performed with a fire gradually increased. A very smoking liquor passes into the receiver; and towards the end of the distillation, a thick, and even concrete matter. When the operation is finished, the liquor is to be poured quickly into a crystal glass-bottle, with a glass stopper. When this bottle is opened, a white, copious, thick, and poignant fume issues, which remains long in the air without disappearing.

The acid in this liquor is far from being saturated, and is capable of still dissolving much tin in the ordinary way. From this imperfect saturation, together with its concentration, proceeds partly its property of smoking so considerably: nevertheless, some other cause probably concurs to give it this property; for though it smokes infinitely more than the most concentrated spirit of salt, its vapours are, notwithstanding, much less elastic. It has all the other properties of concentrated marine acid when imperfectly saturated with tin. If it is diluted with much water, most of the metal separates in light white flocks. In dyeing it produces the same effects as solution of tin made in the common way. If the distillation is continued after the smoking liquor of Libavius has come over, the mercury of the corrosive sublimate will then arise in its proper form.

7. *Lead.* Marine acid, whether in its concentrated or diluted state, has little effect upon lead, unless assisted by heat. If spirit of salt is poured on filings of lead, and the heat is increased so as to make the liquor boil and distil, a part of the acid will be retained by the metal, which will be corroded into a saline mass; and this, by a repetition of the process, may be dissolved into a limpid liquor. If lead is dissolved in aqua fortis, and spirit of sea-salt, or sea-salt itself, added, a precipitation of the metal ensues; but if some aqua regia is added, the precipitate is redissolved.

The combination of lead with marine acid, has, when melted, some degree of transparency and flexibility like horn; whence, and from its resemblance to luna cornea, it is called *plumbum corneum*. This substance is used in preparing phosphorus, according to Mr Margraaf's method.

8. *Quicksilver.* Marine acid in its limpid state, whether concentrated or diluted, has no effect upon quicksilver, even when assisted by a boiling heat; but if mercury is dissolved in the vitriolic or nitrous acids, and sea-salt, or its spirit, is added to the solution, it immediately precipitates the quicksilver in the same manner as it does silver or lead. If concentrated marine acid, in the form of vapour, and strongly heated, meets with mercury in the same state, a very intimate union takes place; and the produce is a most violent corrosive and poisonous salt, called *corrosive sublimate mercury*. This salt is soluble, though sparingly, in water; but is far from being perfectly saturated with mercury; for it will readily unite with almost its own weight of fresh quicksilver, and sublime with it into a solid white mass (which, when levigated, assumes a yellowish colour) called *mercurius dulcis*, *aquila alba*, or *calomel*.

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Lead.

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Plumbum corneum.

250
Quicksilver.

251
Corrosive sublimate.

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Different
methods of
making.

There have been many different ways of preparing corrosive mercury, recommended by different chemists. Neuman mentions no fewer than ten. 1. From mercury, common salt, nitre, and vitriol. 2. From mercury, common salt, and vitriol. 3. Mercury, common salt, and spirit of nitre. 4. Solution of mercury in aqua fortis and salt. 5. Solution of mercury in aqua fortis, and spirit of salt, or the white precipitate. 6. Mercury, common salt, nitre, and oil of vitriol. 7. Edulcorated turbit mineral, and common salt. 8. Red precipitate, common salt, and oil of vitriol. 9. Edulcorated turbit mineral, and spirit of salt. 10. Mercury, fil ammoniac, and oil of vitriol.

From a view of these different methods, it is evident, that the intention of them all is to combine the marine acid with quicksilver; and as this combination can be effected without making use of the nitrous acid, the greatest chemists have imagined that this acid, which is by far the most expensive of the three, might be thrown out of the process altogether, and sublimate be more conveniently made by directly combining marine acid and mercury in a process similar to the distillation of spirit of salt. This method was formerly recommended by Kunckel; then published in the memoirs of the Academy of Sciences for 1730; and has been adopted and recommended by Dr Lewis.

The process consists in dissolving mercury in the vitriolic acid, as directed for making turbit mineral, (see n° 153). The white mass remaining on the effication of this solution is to be triturated with an equal weight of dried salt, and the mixture is then to be fublimed in a sand-heat; gradually increasing the fire till nothing more arises.

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Differences
of quality.

Neuman observes, that there is a considerable difference in the quality of sublimate made by the different methods he mentions; particularly in those made with, or without nitre. This we have also found to be the case; and that sublimate made without the nitrous acid is never so corrosive, or soluble in water, as that which is made with it: nor will it afterwards take up so large a quantity of crude mercury as it otherwise would, when it is to be formed into calomel. The above process, therefore, tho' very convenient and easy, is to be rejected; and some other, in which the nitrous acid is used, substituted in its stead. This is another instance where a rigid adherence to the established rules of chemistry will lead people into a mistake. See n° 117.

From Tachenius, Neuman gives us the following process, which he says was the method of making sublimate at London, Venice, and Amsterdam. Two hundred and eighty pounds of quicksilver; 400 pounds of calcined vitriol, 200 pounds of nitre, the same quantity of common salt, and 50 pounds of the caput mortuum remaining after a former sublimation, or (in want of it) of the caput mortuum of aqua fortis, making, in all, 1130 pounds, are well ground, and mixed together; then set to sublime in proper glass vessels placed in warm ashes; the fire is increased by degrees, and continued for five days and nights. In the making such large quantities, he says, some precautions are necessary, and which those constantly employed herein are best acquainted with. The principal are, the due mixture of the ingredients, which in

some places is performed in the same manner as that of the ingredients for gun-powder, (see GUN-POWDER): that a head and receiver be adapted to the subliming glass, to save some spirit of nitre which will come over. (Here a bent tube of glass will answer the purpose, as already mentioned, n° 80). The fire must not be raised too hastily. When the sublimate begins to form, the ashes must be removed a little from the sides of the glass, or the glass cautiously raised up a little from the ashes. (This last, we think, is highly imprudent.) Lastly, the laboratory must have a good chimney, capable of carrying off the noxious fumes. The above-mentioned quantities commonly yield 260 pounds of sublimate; the 290 pounds of quicksilver gaining 80 from the 200 pounds of sea-salt. The makers of sublimate in France, he says, employ, in one operation, only 20 pounds of mercury. This they dissolve in aqua fortis, evaporate the solution to dryness, mix the dry matter with 20 pounds of decrepitated sea-salt and 60 of calcined vitriol, and then proceed to sublimation.

The above processes, particularly the last, are unexceptionable as to the production of a sublimate perfectly corrosive; but the operation, it is evident, must be attended with considerable difficulty, by reason of the large quantity of matter put into the glass at once. We must remember, that always on mixing a volatile salt with a quantity of fixed matter, the sublimation of it becomes more difficult than it would have been had no such matter been mixed with it. It is of considerable consequence, therefore, in all sublimate operations, to make the quantity of matter put into the glass as little as possible. It would seem more proper, therefore, instead of the calcined vitriol used in the processes last mentioned, to dissolve the mercury in the vitriolic acid, as directed for turbit mineral, and sublime the dry mass mixed with nitre and sea-salt.

It has been said, that corrosive sublimate mercury was frequently adulterated with arsenic; and means have even been pointed out for detecting this supposed adulteration. These means are, to dissolve a little of the suspected salt in water, and add an alkaline lixivium to precipitate the mercury. If the precipitate was of a black colour, it was said to be a certain sign of arsenic. This, however, shews nothing at all, but that either the alkali contains some inflammable matter, which, joining with the precipitate, makes it appear black; or that the sublimate is not perfectly corrosive; for if a volatile alkali is poured on levigated *mercurius dulcis*, the place it touches is instantly turned black.

Mercurius dulcis, or calomel, is prepared by mixing *Mercurius* equal parts, or, at least, three of quicksilver, with four *dulcis*. of sublimate; after being thoroughly ground together in a glass or stone mortar, they are to be poured through a long funnel into a bolt-head, and then sublimed. The medicine has been thought to be improved by repeated sublimate operations, but this is found to be a mistake.

g. *Zinc*. This semi-metal dissolves readily in the marine acid, into a transparent colourless liquor. It is volatilized, as well as most other metallic substances, by this combination, as appears from the following process delivered by Neuman.

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Observations
on the
different
methods.255
Supposed
adulteration
with arsenic

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Zinc volat-
ilized.

"Equal parts of filings of zinc and powdered fal ammoniac being mixed together, and urged with a gradual fire in a retort; at first arofe, in a very gentle heat, an excessively penetrating volatile spirit, fo strong as to ftrike a man down, who fhould inadvertently receive its vapour freely into the nofe. This came over in fubtile vapours, and was followed by a fpirit of falt in denfe white fumes. In an open fire, white flowers fucceeded; and, at length, a reddifh and a black butter. In the bottom of the retort was found a portion of the zinc, in its metalline form, with a little ponderous and fixed butyraceous matter, which liquified in the air. The lump was far more brittle than zinc ordinarily is; of a reddifh colour on the outfide, and blackifh within. The bottom of the retort was variegated with yellow and red colours, and looked extremely beautiful. The remaining zinc was mixed afresh with equal its weight of fal ammoniac, and the procefs repeated. A volatile alkaline fpirit and marine acid were obtained as at firft; and in the retort was found only a little black matter. When the zinc was taken at firft in twice the quantity of the fal ammoniac, the part that preferved its metallic form proved lefs brittle than in the foregoing experiment; and the retort appeared variegated in the fame manner; on endeavouring to rectify the butter, the retort parted in two, by the time that one half had diftilled." The nature of this combination is unknown.

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Butter of
antimony.

10. *Regulus of antimony.* This femi-metal cannot be united with the marine acid, unlefs the latter is in its moft concentrated ftate. The produce is an excessively cauftic thick liquid, called *butter of antimony.* The procefs for obtaining this butter, is fimilar to that for diftilling the fuming fpirit of Libavius. (See n^o 247). Either crude antimony, or its regulus, may be ufed; for the fpirit of falt will attack the reguline part of this mineral, without touching the fulphureous. Three parts of corrofive fublimat are to be mixed with one of crude antimony; the mixture to be digefted in a retort fet in a fand heat; the marine acid in the fublimat will unite with the reguline part of the antimony. Upon increafing the fire, the regulus arifes, difolved in the concentrated acid, not into a liquid form, but that of a thick unctuous fubftance like butter, from whence it takes its name. This fubftance liquifies by heat, and requires the cautious application of a live coal to melt it down from the neck of the retort. By rectification, or expofure to the air, it becomes fluid, like oil, but ftill retains the name of butter. If water is added to butter of antimony, either when in a butyraceous form, or when become fluid by rectification, the antimony is precipitated in a white powder called *powder of algaroth*, and improperly *mercurius vitæ*. This powder is a violent and very unfafe emetic. The butter itfelf was formerly ufed as a cauftic; but it feems totally neglected in the prefent practice.

When the mercurius vitæ precipitates, the union between the marine acid and regulus is totally difolved; fo that the powder, by frequent washings, becomes perfectly free from every particle of acid, which unites with the water made ufe of, and is then called, very improperly, *phloftophic fpirit of vitriol*.

11. *Regulus of cobalt.* Pure fpirit of falt difolves this femi-metal into a reddifh yellow liquor, which immediately becomes green from a very gentle warmth. On faturating the folution with urinous fpirits, the precipitate appears at firft white, but afterwards becomes blue, and at length yellow. If the nitrous acid is added to folutions of regulus of cobalt, they affume a deep emerald green when moderately heated, and on cooling become red as at firft. Duly evaporated, they yield rofe-coloured cryftals, which change their colour by heat in the fame manner. This folution makes a curious fymphathetic ink, the invention of which is commonly afcribed to M. Hellot, though he himfelf acknowledges that he received the firft hint of it from a German chemift in 1736. Any thing wrote with this folution is invifible when dry and cold; but affumes a fine green colour when warm, and will again difappear on being cooled; but if the heat has been too violent, the writing ftill appears. Mr Hellot obferves, that if nitre or borax be added to the nitrous folution, the characters wrote with it become rofe-coloured when heated; and if fea-falt is afterwards paffed over them, they become blue; that with alkali fufficient to faturate the acid, they change purple, and red with heat.

Arsenic. This fubftance is foluble in all acids; but the nature of the compounds formed by fuch an union is little known. If half a pound of arfenic is diftilled with one pound of corrofive fublimat, a thin fuming liquor and a butyraceous fubftance will be obtained, as in making the fuming liquor of Libavius, (fee n^o 247). By repeated rectifications, this butter may be almoft all converted into fpirit. If equal parts of the arfenic and fublimat are ufed, a ponderous black oil comes over along with the fpirit, which cannot be mixed with it. By rectification in a clean retort, they will become clear, but ftill will not incorporate. If they are now returned upon the red mafs remaining in the firft retort, and again diftilled, a much more ponderous oil than the former will be obtained.

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Oil of arse-
nic.

Marine Acid combined with Inflammable Substances.

The acid of fea-falt is very little difpofed to contract any union with the phlogifton, while in a liquid ftate; and much lefs fo, even in its moft concentrated ftate, than either the vitriolic or nitrous. Mr Beaumé, however, has found that a fmall quantity of ether, fimilar to that prepared with the vitriolic and nitrous acids, may be obtained by caufing the fumes of the marine acid unite with thofe of fpirit of wine. Others, and particularly fome German chemifts, attempted to make this liquor, by employing a marine acid previously combined with metallic fubftances, fuch as butter of antimony. The *fuming liquor of Libavius*, (n^o 247), fucceeds beft. If equal parts of this liquor, and highly rectified fpirit of wine are diftilled together, a confiderable quantity of true ether is produced; but which, like the vitriolic and nitrous ether, muft be rectified, in order to its greater purity. The tin contained in the fuming liquor is feparated, and precipitated in white powder. In this procefs, the acid is probably more difpofed to unite with the fpirit of wine, by having already begun to combine with the inflammable principle of the metal.

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Marine
ether.

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Attraction
for phlogi-
ston.

Dr Priestley has observed, that the pure marine acid, when reduced to an invisible ærial state, has a strong affinity with phlogiston, so that it decomposes many substances that contain it, and forms with them an air permanently inflammable. By giving it more time, it will extract phlogiston from dry wood, crusts of bread not burnt, dry flesh; and, what is still more extraordinary, from flints.

Essential oil of mint absorbed the marine acid air pretty fast, and presently became of a deep brown colour. When taken out of this air, it was of the consistency of treacle, and sunk in water, smelling differently from what it did before; but still the smell of the mint was predominant. Oil of turpentine was also much thickened; and became of a deep brown colour, by being saturated with acid air. Ether absorbed the air very fast; and became first of a turbid white, and then of a yellow and brown colour. In one night a considerable quantity of strongly inflammable air was produced.

Having once saturated a quantity of ether with acid air, he admitted bubbles of common air to it, through the quicksilver by which it was confined, (see AIR, n° 49.) and observed that white fumes were made in it, at the entrance of every bubble, for a considerable time. Having, at another time, saturated a small quantity of ether with this kind of air, and the vial which contained it happening to be overturned, the whole room was instantly filled with a white cloud, which had very much the smell of ether, but peculiarly offensive. Opening the door and window of the room, this light cloud filled a long passage, and another room. The ether, in the mean time, was seemingly all vanished; but, some time after, the surface of the quicksilver in which the experiment had been made, was covered with a very acid liquor, arising probably from the moisture in the atmosphere, attracted by the acid vapour with which the ether had been impregnated. This seems to shew, that, however much disposed the marine acid may be to unite with phlogistic matters when in its ærial state, the attraction it has for them is but very slight, and still inferior to what it has for water.

Camphor was presently reduced into a fluid state by imbibing this acid air; but there seemed to be something of a whitish sediment in it. After continuing two days in this situation, water was admitted to it, upon which the camphor immediately resumed its former solid state; and to appearance was the same substance that it had been before.

Strong concentrated oil of vitriol, being put to marine acid air, was not at all affected by it in a day and a night. In order to try whether it would not have more power in a condensed state, it was compressed with an additional atmosphere; but, on taking off this, the air expanded again, and was not in the least diminished. A quantity of strong spirit of nitre was also put to it without any sensible effect. From these last experiments it appears, that the marine acid is not able to dislodge the other acids from their union with water.

IV. OF THE FLUOR ACID.

The discovery of this curious acid we owe to

Mr Scheele, a Swedish chemist, from whom it is often distinguished by the name of the *Swedish acid*. Mr Scheele was of opinion, that this acid is one of the component parts of a sparry substance called *fluor sparatus*. This substance he reckons to be composed of a calcareous earth, and the particular species of acid obtained from it by distillation; and accordingly relates, that he produced the same kind of spar by adding this acid to lime-water. The most remarkable circumstance, however, attending this acid is, that when the vapour of it is mingled with water placed in the receiver for that purpose, a white spot is formed on the surface of the water, which, by degrees, spreads entirely over the surface of it. On agitating the receiver, this crust, being broken into several pieces, was thereby sunk to the bottom. On the contact of the succeeding vapours, a new crust was immediately formed, and the water soon became considerably acid. The white crust, which first appeared on the surface of the water in the receiver, and which afterwards sunk to the bottom, was found by him to possess all the properties of a real *fixe*, or stony substance. It could not be dissolved in any of the acids, nor would it form any paste with water. It dissolved in an alkaline lixivium; suffered no change from fire, when exposed to its single action; but, on the addition of an alkali, melted into glass. This glass, mixed with thrice its own quantity of vegetable fixed alkali, melted into a blue mass; which, being pounded, and put into a damp cellar, very soon ran *per deliquium*, and turned into a gelatinous substance. An acid precipitated a powder from it; and lastly, it was dissolved in borax without the least effervescence.

The inference drawn by the author from these circumstances is, that this *fixe*, or stony crust, thus produced from the sparry fluor, is solely compounded of the acid of spar united with the particles of the water in the receiver. From some other processes he concludes, that the whole of this singular acid may be converted into flint by the addition of water: and that the water is a necessary ingredient in this compound body, he infers from other processes; in which it appears, that when the receiver contained alcohol, oil of olives, or oil of vitriol, no stony crust was formed; and that it appeared only when there was water in the receiver.

His method of operating upon this substance was, to distil it with oil of vitriol in glass vessels; and another very remarkable fact concerning it was, that all those vessels were so corroded, that holes were made through them. This occasioned some doubt with respect to the stony crust formed on the water in the receiver, as it might reasonably enough be imagined that it proceeded from the particles of sand or flint originally existing in the glass, which the acid parted with on its meeting with the water. Mr Scheele, however, fell upon a way to obviate this objection, by exposing a piece of wet charcoal to the vapours of the acid, as they arose from the mixture of oil of vitriol and spar, and found the same stony crust formed upon it as when the vapour was suffered to mingle directly with water in the receiver.

Mr Boulanger, who examined this acid with great care, concludes, that it is the acid of sea-salt, joined with

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Whence
procured.

PRACTICE with an earthy substance, but does not pretend to decide this matter with certainty. Mr Scheele himself was of opinion, that the fluor acid was distinct from the marine and all other acids; because he found it dislodged from the spar by the nitrous and marine, as well as by the vitriolic acid: but those who repeated the experiments after him could procure no fluor acid, except by using the vitriolic.

ad 264
Fluor acid
air.

Dr Priestley, who had exhibited other acids in the form of air, was very desirous of making similar experiments on this. Accordingly, having put some pounded spar into a vial, and poured oil of vitriol upon it, he filled it with a tube, and the other apparatus for receiving the air which should be expelled from it; (see AIR, n° 49.) He observed, that when the fluor acid vapour issued out of the tube, and mingled with the external air, a permanent white cloud was formed; which he attributes to the attachment of the acid to the water contained in the air. The moment that water came into contact with this air, the surface of it became white and opaque, by a stony film; which, forming a separation between the air above and the water below, considerably retarded the ascent of the water, till the air insinuating itself through the pores and cracks of the crust, the water necessarily rose as the air diminished; and, breaking the crust, presented a new surface to the air, which immediately was covered with another crust. Thus one stony incrustation was formed after another, till every particle of the air was united to the water, and the different films being collected and dried, formed a white powdery substance, generally a little acid to the taste; but when washed in much pure water, was perfectly insipid. The property of corroding glass he found to belong to this air only when pretty hot.

The Doctor is of opinion, that this acid is only the vitriolic, loaded with plenty of sparry crust, and volatilized by a little phlogiston. What he reckons an experiment sufficient to determine this matter, is, that having pressed out the stony matter with which the acid liquor in the receiver was impregnated, he found it to yield air which formed no crust on the surface of other water, but was imbibed by it in the same manner as the vitriolic acid air he had formerly made experiments on. The proof, however, would have been more convincing to chemists, had he formed a little vitriolated tartar, or Glauber's salt, by uniting it with a fixed alkali.

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How prepared.

V. Of the SAL SEDATIVUS, or Acid of Borax.

This is a saline substance of a very singular nature, and hitherto found no where but in borax itself. From this it is separable either by sublimation or crystallization. The method by sublimation, is that recommended by Homberg, who first discovered the sedative salt. His process consists in mixing green vitriol with borax, dissolving them in water, filtering the solution, and evaporating till a pellicle appears: the liquor is then to be put into a small glass alembic, and the sublimation promoted till only a dry matter remains in the cucurbit. During this operation, the liquor passes into the receiver; but the internal surface of the capital is covered with a saline matter forming very small, thin, laminated crystals, very shining, and

very light. This is the sedative salt. The capital is then to be unluted, and the adhering salt swept off with a feather; the part of the liquor, which passed last into the receiver, is to be poured on the dry matter in the cucurbit, and a new sublimation is to be promoted as before, by distilling till the matter in the cucurbit is dry. These operations are to be frequently repeated, in the same manner, till no more sedative salt can be obtained.

To obtain the sedative salt by crystallization, borax is to be dissolved in hot water; and to this solution any one of the three mineral acids is to be gradually added, by a little at a time, till the liquor be saturated, and even have an excess of acid, according to Mr Beaumé's process. The liquor is then to be left in a cold place; and a great number of small, shining, laminated crystals will be formed: these must be washed with a little very cold water, and drained upon brown paper. The sedative salt obtained by this process is somewhat denser than that obtained by sublimation; the latter being so light, that 72 grains are sufficient to fill a large vial.

Sedative salt, though thus capable of being once sublimed, is not, however, volatile: for it arises only by means of the water of its crystallization; and when it has once lost its water by drying, it cannot be raised into vapours by the most violent fire, but remains fixed, and melts into a vitreous matter, like borax itself. This glass is soluble in water, and then becomes sedative salt again. A great quantity of water is required to dissolve the sedative salt, and much more of cold than of boiling water; whence it is crystallizable by cold, as it also is by evaporation; a singular property, which scarce belongs to any other known salt.

This substance has not an acid, but a somewhat bitterish taste, accompanied with a slight impression of coolness. It nevertheless unites with alkaline salts as acids do, and forms with them neutral salts. It is soluble in spirit of wine, to which it communicates the property of burning with a green flame. It makes no change on the blue colour of vegetables, as other acids do. It expels the other acids from their basis, when distilled with a strong heat; though these are all capable of expelling it in the cold, the acid of vinegar not excepted.

The composition of sedative salt is very much unknown, as no means sufficient for its decomposition have hitherto been found out. Mr Bourdelin who made many experiments on this salt, found that it was unalterable by treatment with inflammable matters, with sulphur, with mineral acids disengaged, or united with metallic substances, and with spirit of wine. He could only perceive some marks of an inflammable matter, and a little marine acid. The former discovered itself by its communicating a sulphureous smell to the vitriolic acid employed; and the latter by a white precipitate formed, in a solution of mercury in the nitrous acid, by the liquor which came over on distilling the salt with powdered charcoal.

Mr Cadet, in the Memoirs of the Royal Academy of Sciences for 1766, has given an account of some experiments made by him on borax and its acid: from which he infers, (1.) That the acid contained in borax itself is the marine, and not sedative, salt. (2.) That

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Fixed in
the fire.

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Its proper-
ties.

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Mr Bour-
delin's ex-
periments.

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Mr Cadet's
experi-
ments.

it

PRACTICE it is the marine, he proves by having made a corrosive sublimate with this acid and *mercurius precipitatus per se*. That sedative salt does not enter the composition of borax itself, he proves, by the impossibility of recomposing borax from uniting the sedative salt with fusible alkali. The salt so produced, he owns, is very like borax, but unfit for the purposes of folding metals as borax is. He therefore thinks, that, in the decomposition of borax, the principles of the salt are somewhat changed, by the addition of that acid which extricates the sedative salt; and that this salt is composed of the marine acid originally existing in the borax, of the vitriolic acid employed in the operation, and of a vitrescible earth. (If this is true, then sedative salt either cannot be procured by any other acid than the vitriolic, or it must have different properties according to the acid which procures it.) The vitrescible earth, he says, is that which separates from borax during its solution in water, and which abounds more in the unrefined than refined borax, and which he thinks consists of a calx of copper, having obtained a regulus of copper from it. As he has never been able, however, to compose borax by the union of these ingredients, his experiments are by no means decisive.

Sedative Salt combined with *Alkalies*.

With the vegetable alkali this salt forms a compound very much resembling borax itself in quality; but in what respects it differs from, or how far it is applicable to the purposes of, borax, hath not yet been determined.

With the mineral alkali, this salt has generally been thought to recompose borax: and, though Mr Cadet has denied this, yet as his experiments are hitherto imperfect and unsupported, we shall here give the history of that salt, as far as it is yet known.

This salt is prepared in the East Indies. It is said, that from certain hills in these countries there runs a green saline liquor, which is received in pits lined with clay, and suffered to evaporate with the sun's heat; that a bluish mud which the liquor brings along with it is frequently stirred up, and a bituminous matter, which floats upon the surface, taken off; that when the whole is reduced to a thick consistence, some melted fat is mixed, the matter covered with vegetable substances and a thin coat of clay; and that when the salt has crystallized, it is separated from the earth by a sieve. In the same countries is found native the mineral alkali in considerable quantity; sometimes tolerably pure, at other times blended with heterogeneous matters of various kinds. This alkali appears to exist in borax, as a Glauber's salt may be formed from a combination of borax with vitriolic acid.

Borax, when imported from the East Indies, consists of small, yellow, and glutinous crystals. It is refined, some say, by dissolving it in lime-water; others, in alkaline lixivium, or in a lixivium of caustic alkali; and, by others, in alum-water. Refined borax consists of large, eight-sided crystals, each of which is composed of small, soft, and bitterish scales. Crystals of this size can by no means be obtained by dissolving unrefined borax in common water. The crystals ob-

tained in this way are extremely small, and differ considerably from the refined borax of the shops; inasmuch that Cramer calls the large crystals, not a purified, but an adulterated borax. When dissolved in lime-water, the borax shoots into larger crystals; and largest of all, when the vessel is covered, and a gentle warmth continued during the crystallization. During the dissolution, borax appears glutinous, and adheres in part to the bottom of the vessel. From this glutinous quality, peculiar to borax among the salts, it is used by dyers for giving a gloss to silks.

All acids dissolve borax slowly, and without effervescence. It precipitates from them most, but not all, metallic substances; along with which a considerable part of the borax is generally deposited. It does not absorb the marine acid of luna cornea, or of mercury sublimate. It melts upon the surface of the fire without uniting, and suffers the latter to rise unchanged; the borax in both cases becomes coloured; in the first, milky with red streaks; in the latter, amethyst or purple. Mixed with sal ammoniac, it extricates the volatile alkali, and retains the acid; but mixed with a combination of the marine acid with calcareous earths, it unites with the earth, and extricates the acid. It extricates the acid of nitre without seeming to unite with the alkaline basis of that salt; nor does it mingle in fusion with the common fixed alkaline salts, the borax flowing distinct upon their surface. A mixture of borax with twice its weight of tartar, dissolves in one sixth of the quantity of water that would be necessary to dissolve them separately: the liquor yields, on inspissation, a viscous, tenacious mass like glue; which refuses to crystallize, and which deliquesces in the air. Borax affords likewise a glutinous compound with the other acids, except the vitriolic; whence this last is generally preferred for making the sedative salt. It proves most glutinous with the vegetable, and least with the marine. With oils both expressed and distilled, it forms a milky, semi-saponaceous compound. It partially dissolves in spirit of wine. In conjunction with any acid, it tinges the flame of burning matters green; the precipitate thrown down by it from metallic solutions has this effect. It does not deflagrate with nitre. Fused with inflammable matters, it yields nothing sulphureous as those salts do which contain vitriolic acid. By repeatedly moistening it when considerably heated, it may be entirely sublimed.

Borax renders all earths and stones fusible by fire, and hence is used for the essaying of ores. It also facilitates the fusion of metals; and is particularly useful when small particles of metal, mixed with dirt and ashes, are to be melted together; as it promotes the fusion of the metal, and the vitrification of the other matters, by which the particles of metal may disengage themselves, and collect into one mass. It is further useful in the fusion of metals, as it defends their surfaces from the combined action of air and fire, by which imperfect metals are calcined. A principal use of borax is in the folding of metals; which it probably does by accelerating the fusion of the surfaces of the metals to be joined, and by clearing them of any calx or other matter by which they might be prevented from being perfectly joined to one another.

272
Its properties.

270
Borax.

271
Refined.

PRACTICE Borax retains a good quantity of water in its crystals; by which it melts and swells up in a heat insufficient to vitrify it. It is then spongy and light, like calcined alum; but, on increasing the fire, it flows like water.

273
How procured.

VI. Of the ACETOUS ACID and its Combinations.

This acid is plentifully obtained from all vinous liquors, by a fermentation of a particular kind, (see **FERMENTATION**, and **VINEGAR**.) It appears first in the form of an acid liquor, more or less deeply coloured, as the vinegar is more or less pure. By distillation in a common copper-still, with a pewter head and worm, this acid may be separated from many of its oily and impure parts. Distilled vinegar is a purer, but not a stronger acid, than the vinegar itself: for the acid is originally less volatile than water, though, by certain operations, it becomes more so. After vinegar has been distilled to about $\frac{1}{5}$ of its original bulk, it is still very acid, but thick and black. This matter continues to yield, by distillation, a strong acid spirit, but tainted with an empyreumatic oil. If the distillation is still continued, a thick black oil continues to come over; and at last some volatile alkali, as in the distillation of animal substances. The caput mortuum left in the distilling vessel, being calcined in an open fire, and afterwards lixiviated, yields some fixed alkaline salt.

271
Sal diuretic.

Acetous Acid combined with Alkaline Salts.

1. **Vegetable Alkali.** The produce of this combination is the *terra foliata tartari*, or sal diuretic of the shops; but to prepare this salt of a fine white flaky appearance, which is necessary for sale, is a matter of some difficulty. The best method of performing this operation is, after having saturated the alkali with the vinegar, which requires about 15 parts of common distilled vinegar to one of alkali, to evaporate the liquor to dryness; then melt the saline mass which remains with a gentle heat; after which it is to be dissolved in water, then filtered, and again evaporated to dryness. If it is now dissolved in spirit of wine, and the liquid abstracted by distillation, the remaining mass being melted a second time, will, on cooling, have the flaky appearance desired.

A good deal of caution is necessary in the first melting; for the acetous acid is easily dissippable, even when combined with fixed alkali, by fire. It is proper, therefore, that, when the salt is melted, a little should be occasionally taken out, and put into water; and, when it readily parts with its blackness to the water, must then be removed from the fire.

275
Acetous acid with fusible alkali.

Fusible Alkali. This alkali combined with the acetous acid, forms a salt whose properties are not well known. Dr Lewis affirms, that it is nearly similar to the *terra foliata tartari*. The author of the Chemical Dictionary, again, maintains it to be quite different: particularly that it crystallizes well, and is not deliquescent in the air; whereas the former cannot be crystallized; and even when obtained in a dry form, unless great care is taken to exclude the air, will pre-

del.

Volatile Alkali. This combination produces a salt so exceedingly deliquescent that it cannot be procured

in a dry form without the greatest difficulty. In a liquid state, it is well known in medicine, as a sudorific, by the name of *spiritus mindereri*. It may, however, be procured in a dry form, by mixing equal parts of vitriolic sal ammoniac and *terra foliata tartari*, and subliming the mixture with a very gentle heat. When the salt is once procured, the utmost care is requisite to preserve it from the air.

Acetous Acid combined with Earths.

Combinations of this kind are but little known. With the calcareous and argillaceous earths compounds of an astringent nature are formed. According to the author of the Chemical Dictionary, the salt resulting from a combination of vinegar with calcareous earth easily crystallizes, and does not deliquesce. With magnesia the acetous acid does not crystallize; but, when inspissated, forms a tough mass, of which two drachms, or two and a half, are a brisk purgative.

Acetous Acid combined with Metallic Bodies.

1. **Copper.** Upon this metal the acid of vinegar does not act briskly, until it is partly at least calcined. If the copper is previously dissolved in a mineral acid, and then precipitated, the calx will be readily dissolved by the acetous acid. The solution is of a green colour, and beautiful green crystals may be obtained from it. The solution, however, is much more easily effected, by employing verdigrise, which is copper already united with a kind of acetous or tartareous acid, and very readily dissolves in vinegar. The crystals obtained by this process are used in painting, under the name of *distilled verdigrise*.

2. **Iron.** Vinegar acts very readily upon iron, and dissolves it into a very brown, and almost black liquor, which does not easily crystallize, but, if inspissated, runs per deliquium. This liquor is employed in the printing of linens, calicoes, &c. being found to strike a finer black with madder, and to injure the cloth less, than solutions of iron in the other acids.

3. **Lead.** The acetous acid dissolves lead in its metallic state very sparingly; but if the metal is calcined, it acts upon it very strongly. Even after lead is melted into glass, the acetous acid will receive a strong impregnation from it, and hence it is dangerous to put vinegar into such earthen vessels as are glazed with lead. In the metallic state, only a drachm of lead can be dissolved in eight ounces of distilled vinegar.

If lead is exposed to the vapours of warm vinegar, it is corroded into a kind of calx, which is used in great quantities in painting, and is known by the name of *cerusi*, or *white lead*. The preparation of this pigment has become a distinct trade, and is practised in some places of this kingdom where lead is procurable at the lowest price. The process for making cerusi is thus given by the author of the Chemical Dictionary.

"To make cerusi, leaden plates rolled spirally, so that the space of an inch shall be left between each circunvolution, must be placed vertically in earthen pots of a proper size, containing some good vinegar. These leaden rolls ought to be so supported in the pots that

PRACTICE

277
Anomalous salts.

278
Distilled verdigrise.

279
Iron liquor for printing cloth.

280
Lead.

281
Cerusi.

PRACTICE that they do not touch the vinegar, but that the acid vapour may circulate freely betwixt the circumvolutions. The pots are to be covered, and placed in a bed of dung, or in a sand-bath, by which a gentle heat may be applied. The acid of vinegar being thus reduced into vapour, easily attaches itself to the surface of these plates, penetrates them, and is impregnated with the metal, which it reduces to a beautiful white powder called *cerufs*. When a sufficient quantity of it is collected on the plates, the rolls are taken out of the pots, and unfolded; the *cerufs* is then taken off, and they are again rolled up, that the operation may be repeated."

"In this operation, the acid being overcharged with lead, this metal is not properly in a saline state; hence *cerufs* is not in crystals, nor is soluble in water: but a saline property would render it unfit for painting, in which it is chiefly employed."

232
Observations on the process for *cerufs*.

Though this process may in general be just, yet there are certainly some particulars necessary to make *cerufs* of a proper colour, which this author has omitted; for though we have carefully treated thin plates of lead in the manner he directs, yet the calx always turned out of a dirty grey colour. It is probable, therefore, that after the lead has been corroded by the steam of vinegar, it may be washed with water slightly impregnated with the vitriolic and nitrous acids.

This preparation is the only white hitherto found fit for painting in oil: but the discovery of another would be very desirable, not only from the faults of *cerufs* as a paint, but also from its injuring the health of persons employed in its manufacture, by affecting them with a severe colic; which lead, and all its preparations, frequently occasion.

283
Sugar of lead.

If distilled vinegar is poured on white lead, it will dissolve it in much greater quantity than either the lead in its metallic form, or any of its calces. This solution, filtered and evaporated, shoots into small crystals, of an austere sweetish taste, called *sugar of lead*. These are used in dyeing, and externally in medicines. They have been even given internally for spitting of blood. This they will very certainly cure; but, at the same time, they as certainly kill the patient by bringing on other diseases. If these crystals are repeatedly dissolved in fresh acids, and the solutions evaporated, an oily kind of substance will at last be obtained, which can scarcely be dried.

284
Inflammable spirit from sugar of lead.

From all the metallic combinations of the acetous acid, it may be recovered in an exceedingly concentrated form, by simple distillation, sugar of lead only excepted. If this substance is distilled in a retort with a strong heat, it hath been said that an inflammable spirit, and not an acid, comes over; but this is denied by Dr Black.

285
Tin.

4. *Tin*. The combination of acetous acid with tin is so little known, that many have doubted whether distilled vinegar is capable of dissolving tin or not. Dr Lewis observes, "That plates of pure tin put into common vinegar begun in a few hours to be corroded, without the application of heat. By degrees a portion of the metal was taken up by the acid, but did not seem to be perfectly dissolved, the liquor appearing quite opaque and turbid, and depositing great part

286
Dr Lewis's experiments concerning the solubility of tin.

of the corroded tin to the bottom, in a whitish powder. **PRACTICE** A part of the tin, if not truly dissolved, is exquisitely divided in the liquor: for, after standing many days, and after passing through a filter, so much remained suspended as to give a whiteness and opacity to the fluid. Acid juices of fruits, substituted to the vinegar, exhibited the same phenomena. These experiments are not fully conclusive for the real solubility of tin in these acids, with regard to the purposes for which chemists have wanted such a solution: but they prove what is more important; that tin, or tinned vessels, however pure the tin be, will give a metallic impregnation to light vegetable acids suffered to stand in them for a few hours."

With regard to other metallic substances, neither the degree of attraction which the acetous acid has for them, nor the nature of the compounds formed by the union of it with such substances, are known; only, that as much of the reguline part of antimony is dissolved in this acid as to give it a violent emetic quality. See *Regulus of Antimony*.

Concentration of the Acetous Acid.

Common vinegar, as any other weak acid, may be advantageously concentrated by frost; as also may its spirit, or the distilled vinegar of the shops: but as the cold, in this country, is seldom or never so intense as to freeze vinegar, this method of concentration cannot be made use of here. If distilled vinegar be set in a water-bath, the most aqueous part will arise, and leave the more concentrated acid behind. This method, however, is tedious, and no great degree of concentration can be produced, even when the operation is carried to its utmost length. A much more concentrated acid may be obtained by distilling in a retort the crystals of copper, mentioned (nº 278) under the name of *disillid verdigresce*. A very strong acid may thus be obtained, which has a very pungent smell, almost as suffocating as volatile sulphureous acid. The count de Lauraguais discovered that this spirit, if heated in a wide-mouthed pan, would take fire on the contact of flaming substances, and burn entirely away, like spirit of wine, without any residuum. The same nobleman also observed, that this spirit, when well concentrated, easily crystallizes without addition.

287
Concentrated vinegar.

This may seem to be the most proper method of obtaining the acetous acid in its greatest degree of strength and purity; but as the process requires a very strong heat to be used towards the end of the operation, it is probable that part of the acetous acid may be by that means entirely decomposed. It would seem preferable, therefore, to decompose pure terra foliata tartari by means of the vitriolic acid, in the same manner as nitre or sea-salt are decomposed for obtaining their acids. In this case, indeed, the acetous acid might be a little mixed with the vitriolic; but that could easily be separated by a second distillation.

Dr Priestley, who gives us several experiments on the vegetable acid when reduced to the form of air, mentions his being easily able to expel it from some exceedingly strong concentrated vinegar, by means of heat alone. This seems somewhat contrary to the count de Lauraguais's observation of the distillation of

289
Dr Priestley's experiments.

PRACTICE the *spirit of verdigrease*, as it is commonly called, to crystallize; but a still greater difference is, that the vegetable acid air extinguished a candle, when, according to the count's observation, it ought to have been inflammable. The most curious property observed by Dr Priestley is, that the vegetable acid air being imbibed by oil olive, the oil was rendered less viscid, and clearer, *almost like an essential oil*. This is an useful hint; and, if pursued, might lead to important discoveries.

Acetous Acid combined with Inflammable Matter.

290
Vegetable
ether.

The only method yet known, of combining acetous acid with the principle of inflammability, is by mixing together equal parts of the strongly concentrated acid called *spirit of verdigrease*, and spirit of wine. The result is, a new kind of ether, similar to the vitriolic, nitrous, and marine. This ether, however, retains some of the acidity and peculiar smell of the vinegar. By rectification with fixed alkali, it may be freed from this acidity, and then smells more like true ether, but still retaining something of the smell, not of the acid, but the inflammable part of the vinegar.

In this process a greater quantity of ether is obtained than by employing the vitriolic acid; which shews that the vegetable acid is essentially fitter to produce ether than the vitriolic. This difference must undoubtedly be attributed to the great quantity of ardent spirit which enters into the composition of the acetous acid, and perhaps already approaches the state of ether.

VII. OF THE ACID OF TARTAR.

291
Tartar.

Tartar is a substance thrown off from wine, after it is put into casks to dehydrate. The more tartar that is separated, the more smooth and palatable the wine is. This substance forms a thick hard crust on the sides of the casks; and, as part of the fine dregs of the wine adhere to it, the tartar of the white wines is of a greyish white colour, called *white tartar*; and that of red wine has a red colour, and is called *red tartar*.

292
Cream of
tartar.

When separated from the casks on which it is formed, tartar is mixed with much heterogeneous matter, from which, for the purposes of medicine and chemistry, it requires to be purified. This purification is performed at Montpellier; and consists first in boiling the tartar in water, filtrating the solution, and allowing the salt to crystallize, which it very soon does; as tartar requires nearly twenty times its weight of water to dissolve it.

The crystals of tartar obtained by this operation are far from being perfectly pure; and therefore they are again boiled in water, with an addition of clay, which absorbs the colouring matter; and thus, on a second crystallization, a very pure and white salt is obtained. The crystals now obtained are called *cream*, or *crystals, of tartar*; and are commonly sold under these names.

To obtain the pure Acid of Tartar.

24 292
Scheele's analysis
of cream of
tartar.

For a long time the cream or crystals of tartar were considered as the purest acid which could be obtained from this substance; but, in the year 1770,

an analysis of tartar was published in the Swedish transactions, by Mr Scheele, a Swedish chemist. His method of decomposing the salt was, to dissolve it in a sufficient quantity of boiling water, then to add chalk in fine powder till the effervescence ceased. A copious precipitation ensued; and the remaining liquor being evaporated, afforded a soluble tartar. This proved, that cream of tartar is not, as was commonly supposed, an acid of a peculiar kind, joined with a great deal of earthy impurities; but really a compound salt, containing an alkali joined with an acid; and that the alkali produced from burnt tartar, is not generated in the fire, but pre-existent in the salt.

The whole sediment obtained in this experiment, is the calcareous earth combined with the acid of tartar, which may justly be called *selelenites tartareus*. (See n° 24). If some diluted vitriolic acid is poured upon this selelenites tartareus, the vitriolic acid expels the acid of tartar, forming a true selelenite with the earth, while the liquor contains the pure acid of tartar. By insipidation this acid may be made stronger, and even formed into small white crystals, which do not deliquesce in the air. A particular species of tartar extracted from sorrel hath been sold for taking spots out of cloths, under the name of *essential salt of lemons*.

293
Essential
salt of lemons.

This experiment was repeated by Dr Black; who farther observed, that if quicklime was used instead of chalk, the whole acid would be absorbed by the lime, and the remaining liquor, instead of being a solution of soluble tartar, would be a caustic lixivium.

Acid of tartar combined with Alkalies.

294
Soluble
tartar.

1. *Vegetable Alkali*. If the pure acid of tartar be combined with this alkali to the point of saturation, a neutral salt is produced, which deliquesces in the air, and is not easily crystallized, unless the liquor be kept warm, and likewise be somewhat alkaline. This salt, called *soluble tartar*, is used in medicine as a purgative; but as its deliquescence does not admit of its being kept in a crystalline form, it is always sold in powder. Hence, those who prepare soluble tartar, take no further trouble than merely to rub one part of fixed alkaline salt with three of cream of tartar, which renders the compound sufficiently neutral, and answers all the purposes of medicine.

295
Regenerated
cream of tartar.

According to Mr Scheele, cream of tartar may be recomposed from the pure acid and alkali, in the following manner: "Upon fixed vegetable alkali pour a solution of the acid of tartar. Continue this till the effervescence is over; the fluid will then be transparent; but if more of the acid is added, it will become turbid, and white, and small crystals like white sand will be formed in it. These crystals are a perfect cream of tartar."

Upon these principles, another method of decomposing cream of tartar might be tried; namely, adding to it as much oil of vitriol as would saturate the alkali, then dissolving and crystallizing the salt: but, by this method, there would be danger of the acid being adulterated with vitriolated tartar.

296
Scheette's
salt.

2. *Fossile Alkali*. The salt produced from an union of cream of tartar with fossile alkali, has been long known under the names of *Seignette's salt*, *sal Rupe*, *lenfis*, or *Roche's salt*; but as the cream of tartar is

now

PRACTICE now discovered to be not a pure acid, but adulterated with a portion of soluble tartar, possibly some differences might be observed if the pure acid was used.

This salt was first invented, and brought into vogue, by one Seignette, an apothecary at Rochelle, who kept the composition a secret as long as he could. Mess. Boulduc and Geoffroy afterwards discovered and published its composition.

To prepare this salt, crystals of mineral alkali are to be dissolved in hot water, and powdered cream of tartar thrown in as long as any effervescence arises. For the better crystallization of the salt, the alkali ought to prevail. The liquor must then be filtered and evaporated, and very fine large crystals may be obtained by cold, each of which is the half of a polygonous prism cut in the direction of its axis. This section, which forms a face much larger than the rest, is, like them, a regular rectangle, distinguishable from the others, not only by its breadth, but also by two distinct diagonal lines which intersect each other in the middle.

3. *Volatile Alkali.* With regard to this combination, all we know as yet, is, that if the alkali is over saturated with acid, a cream of tartar, almost as difficult of solution as that of fixed alkali, will be obtained.

Acid of Tartar combined with *Earths*.

All that is as yet known concerning these combinations, is, that with the calcareous earth a compound not easily soluble in water is formed. The other properties of this substance, and the nature of combinations of tartarous acid with other earths, are entirely unknown.

Acid of Tartar combined with *Metallic Substances*.

1. *Copper.* In its metallic state, cream of tartar acts but weakly on this metal, but dissolves verdigrise much more perfectly than distilled vinegar can. The solution with cream of tartar, being evaporated, does not crystallize, but runs into a gummy kind of matter; which, however, does not attract the moisture of the air. It readily dissolves in water, and makes a beautiful bluish green on paper, which has the property of always shining, as if covered with varnish. The effects of the pure acid on this metal have not yet been tried.

2. *Iron.* The effects of a combination of iron with the pure acid have not hitherto been tried. Cream of tartar dissolves this metal into a green liquor, which being evaporated runs *per deliquium*. It has been attempted to substitute a solution of this kind to the liquor used in printing calicoes formed of iron and four beer; but this gave a very dull brownish colour with madder. Possibly, if the pure acid was used, the colour might be improved. In medicine, a combination of cream of tartar with iron is used, and probably may be an useful chalybeate.

3. *Regulus of Antimony.* See Sect. III.

VIII. OF THE ACID OF SUGAR.

That sugar contains an acid, which on distillation by a strong fire arises in a liquid form, in common with that of most other vegetable substances, has been generally known; but how to obtain this acid in a concrete form, and to appearance as pure and crystal-

lizable as the acid of tartar, we were entirely ignorant, till the appearance of a treatise intitled, *Dijfer-tatio Chemica, de Acido Sacchari*, auctore Johanne Afzelio Arvidsson, 4^{to}, Upsalæ.

Of the method of procuring, and the properties of, this new acid, we have the following account in the Edinburgh Medical Commentaries, vol. iv.

"1. To an ounce of the finest white sugar in powder, in a retort with a neck, add three ounces of strong spirit of nitre.

"2. The solution being finished, and the phlogiston of the spirit of nitre mostly exhaled, let a receiver be properly fitted to the retort and luted, and the liquor then made to boil gently.

"3. When the solution has obtained a brownish colour, add three ounces more of spirit of nitre, and let the ebullition be continued till the fumes of the acid are almost gone.

"4. The liquor being at length emptied into a larger vessel, and exposed to a proper degree of cold, quadrangular prismatic crystals are observed to form; which being collected, and dried on soft paper, are found to weigh about 109 grains.

"5. The remaining liquor being again boiled in the same retort, with two ounces of fresh spirit of nitre, till the red vapours begin to disappear; and being then in the same manner exposed to crystallize, about 43 grains of saline spiculae are obtained.

"6. To the liquid that still remains, about two ounces more of spirit of nitre being added, and afterwards the whole being, both by boiling and evaporation, reduced to a dry mass, a brown, saline, gelatinous kind of substance is produced, which, when thoroughly dry, is found to weigh about half a drachm.

"In the same manner, a similar acid, we are told, may be obtained from different saccharine substances, as *gum-arabic*, *honey*, &c.; but from none in such quantities, or so pure, as from fine sugar."

This salt possesses some very singular properties, of which what appears to us the most remarkable, and which we cannot help reading with some degree of doubt, is, that it produces an effervescence on being added to such *alkaline, earthy, or metallic substances, as contain the vitriolic acid*. From this we should be apt to think, that this acid was capable of dissolving even the vitriolic acid from its basis.

Acid of sugar, being distilled in a retort, gives over about $\frac{1}{3}$ of its weight of water. By an intense heat it melts, and is partly sublimed; leaving in the retort a dark grey mass, of about the fifth part of the weight of the crystals made use of. The sublimed salt easily recovers its crystalline form, and seems to have undergone no further change by sublimation than being rendered more pure. During the distillation a great quantity of elastic vapour rushes out, (about 100 cubic inches from half an ounce of the crystals), which, from the distilled liquor's precipitating lime-water, we may judge to be fixed air. In a second sublimation, white fumes are sent over, which, when cold, appear to be an acid, glassy-coloured liquor, but cannot be again crystallized.

"Such parts of the salts as adhere to the sides and necks of the vessels, do not appear to be in the least changed in the process." (What these parts are, we do not comprehend). On a third sublimation, these

301
Crystals of
Saccharine
acid.

302
Presumpti-
on of its ex-
pelling the
vitriolic ac-
id.

parts

297
Selenites
tartarous.

298
A fine green
colour.

299
Chalybeate
acid tartar.

300
Saccharine
acid.

PRACTICE

PRACTICE

333
Great acid
power.

parts produced such elastic vapours as burst the receiver.

This singular salt has a considerable acid power; twenty grains of it giving a very considerable degree of acidity to a large tankard of water. It dissolves in an equal weight of distilled water, but concretes on the liquor's growing cool. It is also soluble in spirit of wine; 100 parts of boiling spirit of wine dissolving 56 of the saccharine crystals, but no more than 40 when cold. The solution in spirit of wine soon becomes turbid; and deposits a mucous sediment, in quantity about $\frac{2}{5}$ of the acid made use of. When cold, irregular scaly crystals are formed, which when dry are perfectly white.

334
Incredible
quantity of
volatile al-
kali saturat-
ed by it.

With vegetable alkali, the acid of sugar can scarcely be formed into crystals, unless either the alkali or acid predominate. With mineral alkali, a salt very difficult of solution is formed. The quantity of volatile alkali saturated by this acid is incredible. "Six parts of a pure volatile alkali (we suppose volatile salts are meant) may be saturated with one of the acid of sugar!" The produce is a quadrangular prismatic salt. With lime this acid unites so strongly, as to be separable by no other means than a strong heat. What kind of a salt results from this combination we are not told; but the author is of opinion, that this shews the use of lime in the purification of sugar, in order to absorb the superfluous acid. Being saturated with some of the *terra ponderosa*, the acid of sugar immediately deposits a quantity of pellucid angular crystals, scarcely soluble in water. With magnesia the salt appears in form of a white powder, soluble neither in water nor spirit of wine, unless the acid prevails. It has a stronger affinity with magnesia, than any of the alkaline salts. With earth of alum, no crystals are obtained; but a yellow pellucid mass, of a sweetish and somewhat astringent taste; which, in a moist air, liquefies, and increases two-thirds in weight.

This acid acts upon all metals, gold, silver, platinum, and quicksilver, not excepted, if they have been previously dissolved in an acid, and then precipitated. Iron in its metallic state is dissolved in very large quantity by the saccharine acid; 45 parts of iron being soluble in 55 of acid. By evaporation, the liquor shoots into yellow prismatic crystals, which are easily soluble in water. With cobalt, a quantity of yellow-coloured crystals are obtained, which being dissolved in water, and sea-salt added to the solution, form a sympathetic ink. The elective attractions of this singular acid are, first, Lime; then the *terra ponderosa*, magnesia, vegetable alkali, mineral alkali, and lastly clays. With spirit of wine an ether was obtained, which cannot easily be set on fire unless previously heated, and burns with a blue instead of a white flame.

335
Saccharine
ether.

336
Whether
this acid is
produced
from the ni-
trous.

Towards the conclusion of his dissertation the author observes, that some may imagine that the acid of nitre, made use of in these experiments, may have a considerable share in the production of what he has termed *acid of sugar*. But, though he acknowledges that this acid cannot in any way be obtained but by the assistance of spirit of nitre, he is thoroughly convinced that it does not, in any degree, enter into its composition.

What occurs to us on this subject is, that if the acid really pre-exists in the sugar, it must give some tokens of its existence by mixing the sugar with other substances besides spirit of nitre. The author himself thinks that lime acts upon the acid part of the sugar: from whence we are apt to conclude, that by mixing lime, in a certain proportion, with sugar, a compound should be obtained somewhat similar to what was formed by a direct combination of lime with the pure acid. In this case, we might conclude that the nitrous acid produces this salt, by combining with the inflammable part of the sugar, becoming thereby volatile, and flying entirely off, so as to leave the acid of the sugar pure. In the distillation of dulcified spirit of nitre, however, we have an instance of the nitrous acid itself being very much altered. This must therefore suggest a doubt, that the acid salt obtained in the present case is only the nitrous acid deprived of its phlogiston, and united with some earthy particles.

IX. OF THE ACID OF PHOSPHORUS.

This acid as yet is but little known. It is obtained in the greatest quantities from human urine, where it is combined with a volatile alkali, forming a singular kind of ammoniacal salts. It is there also found in combination with the vegetable fixed alkali; (see Sect. VI.) It may also be obtained from most vegetable substances, by distillation with a very violent heat; but in small quantity. When obtained in this manner, it combines with the phlogiston of the matter distilled, and assumes the form of phosphorus. As the only method of procuring this acid, without the trouble of a very tedious, and even dangerous, distillation, is by evaporation and crystallization, we shall here give the process for extracting the microcosmic salt from urine.

337
Phospho-
rine acid.

"A large quantity of urine is to be evaporated to the consistence of a thin syrup; which, being set in a cold place, will yield, in three or four weeks, foul brown-coloured crystals, which are the microcosmic salt, mixed with the marine, and other salts of urine. These crystals are to be dissolved in hot water; the solution filtered whilst it continues hot, and set to crystallize again; and the solution, filtration, and crystallization, repeated till the salt becomes pure and white. In all the crystallizations the microcosmic salt shoots first, and is easily distinguished and separated from the others. If the urine which remains after the first crystallization be further evaporated, and again set in the cold, it will yield more crystals; but browner and more impure than the former; and therefore requiring to be purified by themselves. From twenty gallons of urine, may be obtained four ounces of pure salt; a considerable part being still left in the residuum.

338
Microcos-
mic salt,
how procured.
red.

"In these operations the heat ought to be gentle, and the vessels either of glass or compact stone-ware. Urine being evaporated in a copper vessel, afforded only a green solution of that metal."

Concerning the nature of the microcosmic salt obtained by the above process, Mr Margraaff gives the following account in the Berlin Memoirs for 1746.

339
Mr Mar-
graaff's ex-
periments.

"Sixteen ounces of the salt, dissolved in a glass retort, in a heat gradually raised, gave over eight ounces of a volatile urinous spirit, resembling that from

PRACTICE from sal ammoniac by quicklime. The residuum was a porous brittle mass, weighing eight ounces. This, urged with a stronger fire in a crucible, bubbled and frothed much, and at length sunk down into the appearance of glass, without seeming to suffer any further diminution of its weight in the most vehement heat.

The vitreous matter dissolved in twice or thrice its quantity of water, into a clear, transparent, acid liquor, somewhat thick, not ill resembling in consistence concentrated oil of vitriol. This liquor totally corroded zinc into a white powder, which, being diluted with water, appeared in great part to dissolve, fixed alkalies occasioning a plentiful precipitation. It acted powerfully upon iron, with some effervescence; and changed the metal into a kind of muddy substance inclining to bluish, in part soluble in water like the preceding. It dissolved likewise a portion of regulus of antimony, and extracted a red tincture from cobalt. On lead and tin it had very little action. Copper it corroded but slightly. On bismuth, silver, and gold, it had no effect at all, either by strong digestion, or a boiling heat. Nor did the addition of a considerable portion of nitrous acid enable it to act upon gold.

“The vitreous salt in its dry form, melted with metallic bodies with a strong fire, acts upon them more powerfully. In each of the following experiments, two drachms of the salt were taken to two scruples of the metal reduced to small parts. (1.) Gold communicated a purple colour to the vitreous salt; on weighing the metal, however, its diminution was not considerable. (2.) Silver lost four grains, or $\frac{1}{10}$; and rendered the salt yellowish, and moderately opaque. (3.) Copper lost only two grains, or $\frac{1}{20}$, though the salt was tinged of a deep green colour. It seemed as if a portion of the salt had been retained by the metal, which, after the fusion, was found to be whiter and more brittle than before. (4.) During the fusion with iron, flashes like lightning were continually thrown out; a phosphorus being generated from the combination of the acid with the inflammable principle of the iron. Great part of the mixture rises up in froth; which, when cold, appears a vitreous scoria, covered on the surface with a kind of metallic skin, which, on being rubbed, changes its green colour to a yellowish. The rest of the iron remains at the bottom of the crucible, half melted, half vitrified, and spongy. (5.) Tin lost 18 grains, or nearly one-half its weight, and rendered the salt whitish; the remaining metal being at the same time remarkably changed. It was all over leafy and brilliant, very brittle, internally like zinc. Laid on burning coals, it first began to melt, then burnt like zinc, or phosphorus. (6.) Lead lost 16 grains, and gave the same whitish colour to the scoriae that tin does. The remaining lead was in like manner inflammable, but burnt less vehemently than the tin; from which it differed also in retaining its malleability. (7.) Mercury precipitated from aqua fortis, and well edulcorated, being treated with the salt in a glass retort, with a fire raised to the utmost, only 12 grains of mercury sublimed; 28 remaining united with the acid, in a whitish, semi-opaque mass. A solution of this, mixed in distilled water, deposited a quantity of a yellowish powder; which, by distillation

in a glass retort, was in great part revived into running mercury. A part also remained dissolved in the clear liquor; for a drop let fall on polished copper instantly whitened it. (8.) Regulus of antimony melted with the vitreous salt, lost eight or nine grains, (about $\frac{1}{2}$); the regulus assumed a fine, brilliant, striated appearance; the scoriae were somewhat opaque. (9.) Bismuth lost eight grains; the scoriae were like the preceding, but the bismuth itself suffered little change. (10.) Zinc, mixed with the salt, and distilled in a glass retort, yielded a true phosphorus, which arose in a very moderate heat. The residuum was of a grey colour, a little melted at the bottom, in weight not exceeding two drachms, so that two scruples had sublimed. This residuum, urged further in a small Hessian crucible, to perfect fusion, emitted an infinity of phosphoric flashes, with a kind of detonation. The matter, grown cold, looked like the scoriae of melted glass. (11.) White arsenic, mixed with this salt, separated in the fire, the greatest part of it subliming, and only so much remaining behind as increased the weight of the salt eight or nine grains. This compound appeared at first transparent; but, on being exposed to the air, became moist, and of an opaque whiteness, much resembling crystalline arsenic. (12.) Cinnabar totally sublimed; suffering no change itself, and occasioning none in the salt. Sulphur did the same. (13.) One part of the salt, mixed with ten of manganese, and melted in a close vessel, gave a semi-transparent mass, some parts of which were bluish. The crucible was lined with a fine purple glazing, and the edges of the mass itself appeared of the same colour.

“The vitreous salt dissolved also, in fusion, metallic calces, and carths. Chalk, with one third its weight of the salt, formed a semi-transparent vitreous mass: calcined marble, with the same proportion, flowed so thin as to run all through the crucible; gypsum, likewise, ran mostly through the crucible; what remained was semi-transparent. Lapis specularis ran entirely through the vessel. Spanish chalk gave a semi-transparent mass, which sparkled on breaking; and fine white clay, a similar one. Saxon topaz and flint were changed into beautiful opal-coloured masses; the earth of alum into a semi-transparent mass, and quick lime into an opaque white one. The mass with flints imbibed moisture from the air; the others not.

“Oil of vitriol, poured upon one fourth its weight of this salt in a retort, raised an effervescence, acquired a brownish colour, and afterwards became turbid and white. On raising the fire, the oil of vitriol distilled, and the matter in the bottom of the retort melted. In the neck was found a little sublimate, which grew moist in the air; as did likewise the remaining salt, which was opaque and whitish. Concentrated spirit of nitre, distilled with this salt in the above proportion, came over unchanged; no sublimate appeared; the residuum looked like glass of borax. The distilled spirit did not act in the least upon gold, even by coction. Strong spirit of sea-salt being distilled in the same manner, no sensible change was made either in the spirit or the salt.

“Equal parts of the vitrified microcosmic salt and salt of tartar being urged with the strongest fire that a glass retort could bear, nothing sensible came over,

PRACTICE nor did the mixture appear in thin fusion. Dissolved in water, filtered, and duly evaporated, it afforded, very difficultly, oblong crystals, somewhat alkaline; the quantity of alkali having been more than enough to saturate the acid. A whitish matter remained on the filter, amounting to seven or eight grains, from two drachms of the mixture; this, after being washed and dried, melted before a blow-pipe, as did likewise the crystals.

310
Expels the
acids of vi-
triolated
tartar, nitre
and sea-salt.

“ This salt seems to extricate, in part, the acids of vitriolated tartar, nitre, and sea-salt. (1.) On distilling a mixture of it with an equal quantity of vitriolated tartar, there came over some ponderous acid drops, which, saturated with fixed alkali, formed a neutral salt greatly resembling the vitriolated tartar. The residuum readily dissolved in water, and difficultly crystallized. (2.) Nitre, treated with the same proportion of the salt, began to emit red vapours. The residuum was of a peach-blossom colour, appeared to have melted less perfectly than the preceding, and dissolved more difficultly in water. The solution deposited a little earthy matter; and, on being slowly evaporated, shot into crystals, which did not deliquesce in the fire. (3.) Sea-salt, distilled in the same manner, manifestly parted with its acid; the residuum was whitish, readily dissolved in water, and afforded some cubical crystals. (4.) Sal ammoniac suffered no change. (5.) Borax, with an equal quantity of vitreous salt, run all through the crucibles.

“ Solutions of this salt precipitated the earthy part of lime-water, of solution of alum, of flint dissolved in fixed alkali, and the combination of marine acid with chalk or quicklime. The precipitate from this last liquor is tenacious like glue, and does not dissolve even in boiling water; exposed to a strong fire, it froths prodigiously, and at last melts into a thick scoria.

“ Solutions of this salt precipitate also sundry metallic solutions; as butter of antimony, solution of silver, copper, lead, iron, mercury, and bismuth, in the nitrous acid; and of tin in aqua regis. The precipitate of iron from spirit of salt is a tenacious mass; that of silver from aqua fortis, sometimes a white powder, sometimes tenacious. Copper from aqua fortis is sometimes thrown down in form of a white powder, and sometimes in that of a green oil, according to the proportions and diluteness of the liquor. Silver is not precipitated at all by this acid from its solution in vinegar, nor gold from aqua regis.

“ An ounce of the vitreous salt, well mixed with half an ounce of foot, and committed to distillation, yielded a drachm of fine phosphorus. The black residuum, being elixated with boiling water, and the liquor passed through a filter, there remained upon the filter eight scruples of a black matter; and, on evaporating and crystallizing the liquor, about seven drachms were obtained of oblong crystals, which did not deliquesce in a moist air, but became powdery in a warm one. These crystals, treated afresh with inflammable matter, yielded no phosphorus. Before a blow-pipe they melted into a transparent globular mass, which, on cooling, became turbid and opaque. Dissolved in water, they precipitated solutions of silver, mercury, copper, and of chalk; though they did not act upon the latter so powerfully, nor produce with it

a gluey mass, as before they had been deprived of PRACTICE their phosphorine acid.”

On this account of the phosphorine, or rather microcosmic, acid, which we have taken from Lewis's notes on Neuman's chemistry, we have only to observe, that the microcosmic salt either contains two distinct acids, one of which only is capable of being united with inflammable matter so as to produce phosphorus; or that the true phosphorine acid itself is capable of a kind of decomposition, by which it may be made incapable of uniting any more with phlogiston. It would seem likewise, that some substances are much more proper for producing phosphorus than others; and that those which contain the greatest quantity of inflammable matter are not the most proper. Thus, half an ounce of foot mixed with a whole ounce of acid, yielded only a *drachm* of phosphorus; while two drachms of acid, with no more than two scruples of zinc, gave two scruples of phosphorus; nor did the distillation seem to be finished.

X. Of the Acid of ANTS.

The acid may be obtained from these insects either by distillation, or simple infusion in water. From red, twenty-four ounces of ants, Neuman obtained eleven ounces and an half of acid as strong as good vinegar, by distillation in *balneo marie*. Of this acid, Mr Margraaf gives the following account in the Berlin Memoirs for 1749.

“ The acid of ants effervesces with alkaline salts, both fixed and volatile. With volatile alkalies it forms a neutral liquor, which, like that composed of the same alkalies and vinegar, yields no concrete salt on distillation. With fixed alkalies it concretes, upon proper exhalation into oblong crystals, which deliquesce in the air. The crystals, or the saturated neutral liquor uncrystallized, on being distilled with a fire increased till the retort begun to melt, yielded a liquor scarce sensibly acid, and afterwards a small quantity of an urinous and partly ammoniacal liquor. The remaining black matter, dissolved in distilled water, filtered and evaporated, shot into large crystals which did not deliquesce in the air, though they were in taste strongly alkaline, effervesced with acids, and had all the other properties by which fixed alkalies are distinguished.

“ This acid dissolves, with great effervescence, coral, chalk, and quicklime; and concretes with them all into crystals which do deliquesce in the air.

“ It does not precipitate silver, lead, or mercury, from the nitrous acid; nor quicklime from the marine. Hence it appears to have no analogy to the marine or vitriolic acids; the first of which constantly precipitates the metallic solutions, and the other the earthy.

“ It does not act upon filings of silver; but (like vegetable acids), it totally dissolves, by the assistance of heat, the calx of silver precipitated from aqua fortis by salt of tartar.

“ It does not dissolve calces of mercury, (as vegetable acids do); but revives them into running quicksilver.

“ It acts very weakly upon filings of copper; but perfectly dissolves copper that has been calcined. The solution yields beautiful, compact, green crystals.

“ It

PRACTICE

PRACTICE

"It dissolves iron-filings with violence; the solution, duly evaporated, shoots into crystals more readily than that made in distilled vinegar. It scarcely acts at all upon filings of tin.

"It does not, according to Mr Margraff, corrode filings of lead; but dissolves, by the assistance of heat, the red calx of lead. The solution crystallizes into a saccharum saturni. In Mr Ray's philosophical letters, it is said, that "lead put into the acid spirit, or fair water, together with the animals themselves, makes a good *saccharum saturni*;" and that this saccharum, on being distilled, "will afford the same acid spirit again, which the saccharum saturni made with vinegar will not do, but returns an inflammable oil with water, but nothing that is acid; and saccharum saturni made with spirit of verdigrease doth the same in this respect with spirit of pismires.

"It dissolves zinc with vehemence, and shoots, upon due evaporation, into inelegant crystals, not at all like those produced with distilled vinegar. On bismuth, or regulus of antimony, it has little effect, either when calcined, or in their metalline state."

XI. Of the ACID of AMBER.

The nature of this acid is as yet but little known, and Mr Pott is the only chemist who seems to have examined it with accuracy. We shall therefore give an abstract of the principal observations and experiments he has made on this salt.

"Salt of amber requires a large quantity of water for its solution. In the first crystallization (being much impregnated with the oil, which rises from the amber along with it), it shoots into spongy flakes, in colour resembling brown sugar-candy; the crystals which succeed prove darker and darker coloured. On repeating the depuration, the crystals appear at top of a clear yellow, or whitish colour, in form of long needles or feathers; at bottom, darker, and more irregular, as are likewise the crystals which shoot afterwards. The crystals neither easily nor become powdery in the air: rubbed, they emit a pungent smell like that of radishes, especially if warmed a little; their taste is acid, not in the least corrosive, but with a kind of oily pungency.

"This salt, kept in the heat of boiling water, loses nothing of its weight, and suffers no alteration. In a great heat it melts like oil; after which a little oily acid arises, then oily striz appear in the lower part of the retort, and the salt sublimates into the neck, partly in the form of a dark yellow butter, and partly in that of feathers, a black coaly matter remaining at bottom; so that, by this process, a part of the salt is destroyed.

"Oil of turpentine has no action on this salt. Highly rectified spirit of wine gains from it a yellow colour in the cold; and, on the application of heat, dissolves a considerable quantity, but deposits great part of it on cooling. The salt thus deposited is somewhat whiter than before, but still continues sensibly yellow. The dulcified spirit of fal ammoniac dissolves it readily, without effervescence, into a yellow liquor; if the salt was foul, the solution proves of a red colour; on burning of the vinous spirit, a neutral liquor remains.

"A solution of salt of amber in water, saturated

with a pure alkaline lixivium, yielded, on inspissation, a saline matter, which would not crystallize, and which, when excicated by heat, deliquescent in the air, leaving a considerable proportion of an earthy, unctuous matter. Being again gently inspissated, it left a brownish salt, very soluble, weighing one half more than the salt of amber employed. This salt effervesced with the vitriolic and nitrous acids: the vapour, which exhaled, was not acid, but oily and sulphureous. On repeating the experiment, and fully saturating the alkali with the salt of amber, the neutral salt made no effervescence with these acids. This salt did not perfectly melt before a blow-pipe; continued in the fire for some time, it effervesced with aqua fortis. In distillation it yielded a bitter, oily, alkalescent spirit, much resembling the spirit of tartar; and towards the end, an empyreumatic oil. The residuum elixated, yielded the alkaline salt again of a brown colour.

"Salt of amber effervesces strongly with volatile alkalies; and, on saturation, forms with them an oily ammoniacal liquor, which, in distillation, totally arises in a fluid form, except that a small portion of a penetrating, oily, saline matter concretes towards the end.

"On distilling salt of amber with an equal quantity of common fal ammoniac, an acid marine spirit came over, of a strong smell, and a brown colour: afterwards, a little white fal ammoniac sublimed; at length arose suddenly a large quantity of a fuliginous or bituminous matter, leaving behind a small portion of a like shining black substance. The coaly matter was considerably more in quantity than the salt of amber employed. On treating it with nitre, red vapours arose, and the mixture detonated with violence. A mixture of it with borax, frothed and swelled up much more than borax by itself; and, on raising the fire, yielded only some oily drops; the acid being destroyed by this salt, as by fixed alkalies and quicklime.

"Spirit of sea-salt, poured upon one-fourth its weight of salt of amber, made scarce any solution in the cold: on the application of heat, nearly the whole coagulated into the consistence of a jelly. In distillation, the spirit of salt arose first; then almost the whole of the salt of amber, partly like firm butter, partly like long striated plumous alum, very pure, and of a fine white colour, its oily matter being changed into a coal at the bottom. The salt, thus purified, makes no precipitation in the solution of silver, and consequently retains nothing of the marine acid; nor does it precipitate solution of quicklime made in spirit of salt, and consequently contains nothing vitriolic. If any of the mineral acids was contained in this salt, it could not here escape discovery; the oil, which in the rough salt is supposed to conceal the acid, being in this process separated.

"Aqua fortis being poured upon one-fourth its weight of salt of amber, extracted a yellowish colour from it in the cold, but dissolved little: on the application of heat, the whole dissolves into a clear liquor, without any coagulation: if the salt is very oily, the solution proves red. In distillation, greatest part arises in a liquid form, with only a very small quantity of concrete salt. The spirit does not act upon gold,

11 D but

314
Extracts
the acids of
fal ammoniac
and nitre.

315
Purified by
the marine
acid.

313
Mr Pott's
experiments.

PRACTICE but dissolves silver, and quicksilver, as at first; a proof that it has received no marine acid from the salt of amber.

"Oil of vitriol being added to twice its weight of salt of amber diluted with a little water, a moderate fire elevated an acidulous liquor, which appeared to proceed from the salt of amber; for its making no change in solution of fixed salt ammoniac, shewed it not to be vitriolic. On continuing the distillation by a stronger fire, greatest part of the salt arises undestroyed, and the oil of vitriol along with it; a black, light, porous earth remaining.

"Equal parts of quicklime and salt of amber gave over in distillation only an acidulous phlegm; the residuum, elixated with water, yielded a solution of the lime in the acid of amber, resembling a solution of the same earth in vegetable acids, precipitable by alkaline salts, and by the vitriolic acid. Lime added to a watery solution of salt of amber, dissolves with some effervescence; after which, the whole coagulates into the consistence of a jelly: this, diluted with water, proves similar to the foregoing solution.

"Solution of salt of amber makes no precipitation in solutions of silver or quicksilver. It dissolves zinc, as all acids do: fixed alkalies precipitate the zinc: the volatile do not; and when a sufficient quantity of the volatile has been added, the fixed make no precipitation. It acts exceeding slowly and difficultly upon copper; but corrodes calcined copper in a shorter time. It soon corrodes iron, by coction, into a crocus, and dissolves a part into a liquid form: the solution has little colour; but alkaline salts readily discover that it holds iron, by rendering it turbid and whitish, and throwing down a considerable quantity of a greenish calx."

XII. Of Fixed ALKALINE SALTS.

316
How procured. Of these there are two kinds; the vegetable, and mineral, (see n° 23.) The first is never found by itself, and but rarely in combination with any acid; but is always prepared from the ashes of burnt vegetables. The second is found native in some parts of the earth. It is likewise found, in very large quantities, combined with the marine acid, in the waters of the ocean, and in the bowels of the earth; thus forming the common alimentary salt. It is also produced from the ashes of certain sea-plants, and of the plant called *kali*; from whence both the mineral and vegetable alkalies have taken their name.

317
Vegetable alkali crystallized. The vegetable alkali difficultly assumes a crystalline form; nevertheless, it may be partially united with some acids in such a manner as to crystallize, and lose its property of deliquating in the air, without, at the same time, ceasing to be an alkali. Of this we have an example in the acid of ants above mentioned. Something of the same kind we have observed in treating vegetable fixed alkali with spirit of wine. A gallon of pretty strong spirit of wine being drawn over from a pound of salt of tartar, a black unctuous liquor was left, which shot into crystals very much resembling vitriolated tartar, and which did not deliquesce in the air, but were nevertheless strongly alkaline.

The mineral alkali in its natural state always assumes a crystalline form, somewhat resembling that of sal mirabile. It does not deliquesce in the air, nor does it

seem to have so strong an attraction for water, even when in its most caustic state, as the vegetable alkali; hence mineral alkali is preferable to it in making soap, which is always of a firmer consistence with mineral than with vegetable alkali. If vegetable alkali is combined with spirit of salt, some change seems to be thereby induced upon it; as the salt produced by expelling the marine acid by means of the vitriolic, and then crystallizing the mals, crystallizes differently from vitriolated tartar. Whether the vegetable alkali might by this means be entirely converted into the mineral, deserves a further inquiry.

Both vegetable and mineral alkalies, when applied to the tongue, have a very sharp, pungent, and urinous taste; but the vegetable considerably more so than the mineral. They both unite with acids, and form different neutral salts with them: but the vegetable alkali seems to have rather a greater attraction for acids than the other; although this difference is not so great, as that a neutral salt, formed by the union of mineral alkali with any acid, can be decomposed by an addition of the vegetable alkali.

Both vegetable and mineral alkali appear to be composed of an exceedingly caustic salt united with a certain quantity of fixed air: (See AIR, n° 10.) This may be increased so far, as to make the vegetable alkali assume a crystalline form and lose great part of its alkaline properties; but as the adhesion of great part of this air is very slight, it easily separates by a gentle heat. Some part, however, is obstinately retained; and the alkali cannot be deprived of it by the most violent calcination *per se*. The only method of depriving it entirely of its fixed air, is by mixing an alkaline solution with quicklime.

Fixed Alkalies combined with Sulphur.

The produce of this is the red fetid compound called *hepar sulphuris*, or liver of sulphur. It may be made by melting sulphur with a gentle heat, and stirring into it, while melted, four times its weight of dry alkaline salt. The whole readily melts and forms a red mass of a very fetid smell, and which deliquesces in the air. If sulphur is boiled in a solution of fixed alkaline salt, a like combination will take place.

In this process, when the *hepar* is made either in the dry or the moist way, the fixed air of the alkali is discharged, according to Dr Priestley's observation. Neither does a fixed alkali, when combined with fixed air, seem capable of uniting with sulphur; nor will the union be accomplished without heat, unless the alkali is already in a caustic state. Hence a cold solution of *hepar sulphuris* may be decomposed, partly at least, by fixed air. On adding an acid, however, the decomposition takes place much more rapidly; and the sulphur is precipitated to the bottom, in form of a white powder.

During the precipitation of the sulphur from an alkali, by means of acids, a thick white smoke arises, of a most fetid smell, and suffocating nature; this smoke seems to approach more nearly to the nature of pure phlogiston, than any substance that hath been hitherto observed. It burns quietly, without explosion, on a candle's being held in it. Calces of silver, lead, iron, or bismuth, are rendered black by it. Hence, if any thing

PRACTICE

318
Change on the vegetable alkali.

319
Difference between vegetable and mineral alkalies.

320
Composed of a caustic salt and fixed air.

321
Hepar sulphuris.

322
Decomposed.

PRACTICE thing is wrote with a solution of lead, and a solution of hepar sulphuris is passed over it when dry, the writing, formerly invisible, will immediately appear of a blackish brown colour. Silver, in its metallic state, is prodigiously blackened either by the contact of this vapour, or by being immersed in a solution of the hepar sulphuris itself. Litharge is instantly re-flored to its metallic state, on being immersed even in a cold solution of hepar sulphuris.

323 Inflammable vapour in the decomposition of it.
324 Phlogiston of sulphur disposed to quit the acid.
By being united with an alkali, the acid of sulphur seems very much disposed to quit the phlogiston. If a solution of hepar sulphur is exposed to the air for some time, it is spontaneously decomposed; the phlogiston of the sulphur flying off, and the acid remaining united with the alkali into a vitriolated tartar. This decomposition takes place so remarkably, when liver of sulphur is dissolved in water, that, by a single evaporation to dryness, it will be almost totally changed into vitriolated tartar. If this substance, in a dry state, be exposed to a moderate degree of heat, and the mass kept constantly stirring, a like decomposition will follow; the phlogiston of the sulphur will fly off, and the acid unite with the alkali.

325 Metals and charcoal dissolved by it.
Liver of sulphur is a great solvent of metallic matters; all of which, except zinc, it attacks, particularly in fusion. It seems to dissolve gold more effectually than other metals; (see Sect. III.) This compound also dissolves vegetable coals, even by the humid way; and these solutions, if suffered to stand in the open air, always precipitate a black powder, no other than the coal they had dissolved, in proportion to the quantity of hepar sulphuris decomposed. When vegetable coal is thus dissolved by liver of sulphur in fusion, it is of a much deeper red than in its natural state. The solution in water is of a green colour.

Fixed Alkalies combined with *Expressed Oils*.

326 Soap.
The result of this combination is *soap*; for the preparation of which in large quantities in the way of trade, see SOAP. The soap which is used in medicine, is prepared without heat, in the following manner, according to the author of the Chemical Dictionary.

"One part of quicklime, and two parts of good "Spanish soda" (the salt prepared from the ashes of the herb kali), "are boiled together during a short time "in an iron caldron. This lixivium is to be filtered, "and evaporated by heat, till a vial, capable of containing an ounce of water, shall contain an ounce "and 216 grains of this lixivium. One part of this "lixivium is to be mixed with two parts of oil of "olives, or of sweet almonds, in a glass or stone-ware vessel. The mixture soon becomes thick and "white; and must be stirred from time to time with "an iron spatula. The combination is gradually completed, and in seven or eight days a very white "and firm soap is obtained."

In attempting combinations of this kind, it is absolutely necessary that the alkali be deprived of its fixed air as much as possible; otherwise the soap will be quite unctuous and soft: for fixed alkalies have a greater attraction for fixed air than for oil, and hence soap is decomposed by blowing fixed air into a solution of it in water.

Fixed Alkalies combined with *Essential Oils*.

The volatility of these oils in a great measure hinders them from being acted upon by alkalies: nevertheless combinations of this kind have been attempted; and the compounds so produced have been called *Starkey's soap*, from one Starkey a chemist who endeavoured to volatilize salt of tartar by combining it with oil of turpentine. His method was, to put dry salt of tartar into a matras, and pour upon it essential oil of turpentine to the height of two or three fingers breadth. In five or six months, a part of the alkali and oil were combined into a white saponaceous compound. This must be separated from the mixture, and more of it will afterwards be formed by the same method.

Chemists, imagining this soap to be possessed of considerable medical virtues, have endeavoured by various methods to shorten this tedious process. Of these one of the most expeditious is that recommended by Mr Beaumé; which consists in triturating, for a long time, alkaline salt upon a porphyry, and adding oil of turpentine during the trituration. According to him, the thick resinous part of the oil only can combine with the salt; and, during the time this combination is effected, the more subtle and attenuated parts will fly off. Hence he finds, that the operation is considerably abridged by the addition of a little turpentine, or common soap. The most expeditious of all, however, is that mentioned by Dr Lewis; which consists in heating the alkali red hot, and then throwing it into oil of turpentine, stirring them well together; on which they immediately unite into a saponaceous mass.

This kind of soap is subject to great alterations from keeping; particularly the loss of its colour, and a kind of decomposition occasioned by the extraction of an acid from the oil of turpentine, which unites with the alkali, and crystallizes not only all over the surface, but in the very substance of the soap. The nature of this salt is unknown, but certainly deserves consideration.

Fixed Alkalies combined with *Phlogiston*.

This combination is effected by calcining them with the charcoal either of vegetable or animal matters. The consequence is, that they are greatly altered in their properties; sometimes so much, as to be unable to precipitate calcareous earths from their solutions in acids. Metallic solutions precipitated by them in this state, assume different colours. (See Sect. III. *Iron*.)

Differences observed between Fixed Alkalies obtained from different *Vegetables*.

These differences we must conceive to arise from some proportion of the oily and phlogistic matter of the vegetable remaining in the ashes from whence the salts are extracted; for when reduced to their utmost purity, by repeated calcinations in a strong fire, and deliquiations in the air, all of them, the marine alkali excepted, appear to be the very same.

On this subject Mr Gmelin has given a great number of experiments in the fifth volume of the *Commentaria Petropolitana*; and found very considerable differences, not only between the alkaline salts, but likewise

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327 Starkey's soap.

328 Mr Gmelin's experiments.

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likewise the pure vegetable earths obtained from different vegetables by burning. (See Sect. II. *Vegetable Earths*.) The salts of the several plants examined were prepared with great care, and all of them exactly in the same manner; each vegetable being burnt in a separate crucible, with the same degree of fire, till no remains of coaly matter could any longer be perceived; and the ashes elixated in glass vessels with cold distilled water. The salts, thus obtained, were found to produce different colours, on mixture with certain liquors; and to effervesce in very different degrees with acids: certain metallic solutions were by some precipitated, by others only rendered thicker, by others both precipitated and rendered thick; whilst some occasioned neither the one nor the other of these changes, but left the fluid clear and transparent. Thus, with the vitriolic acid, the salts of southernwood and sage struck a pale brown colour; those of pine-tops and rue, a yellow; that of fern, a reddish yellow; and that of fennel, a dark leek-green: that of dill yielded a leek-green precipitate, with elegant green flakes floating in the liquor. This last salt also gave a greenish precipitate with the marine acid, and a red one with the nitrous. Solution of corrosive sublimate was changed yellow by salt of southernwood; of a brownish colour, by that of colts-foot; of a deep red, by that of wormwood; and of a pitch colour, by that of dill. That of fern threw down an opal-colour; of fige, a sulphur-yellow; of elder flowers, a citron-yellow; of fennel, a saffron-colour; and of milfoil a deep-red precipitate. From solution of silver, salt of *carduus benedictus* threw down a white; of camomile, a grey; of hyssop, a brownish; of dill, a blackish brown; of scabrous, a yellowish; and that of pine-tree tops, a sulphur-yellow precipitate. Solution of vitriol of copper was changed by salt of southernwood to a bright sea-green, by that of dill to an unsightly-green, of agrimony to a greenish-blue, and by that of milfoil to a bright sky-blue: the salt of penny-royal made the liquor thick as well as blue, and that of feverfew made it thick and green: the salt of hyssop threw down a green precipitate, that of scurvy-grass a blue one, and that of fumitory a greenish-blue; whilst the salt of fern made scarcely any change either in the colour or consistency of the liquor.

XIII. OF VOLATILE ALKALI.

This is a kind of salt obtained from all animal, some vegetable substances, and from soot, by distillation with a strong heat; and from all vegetable substances by putrefaction. Though a volatile alkali is procurable from all putrid animal substances by distillation, yet the putrefactive process does not seem to prepare volatile alkali in all of these. Putrid urine, indeed, contains a great quantity of alkali ready formed, whence its use in scouring, &c. but the case is not so with putrid blood or flesh. These afford no alkali till after the phlegm has arisen; and this they would do, though they had not been putrefied.

Volatile alkali, when pure, appears of a snowy whiteness; has a very pungent smell, without any disagreeable empyreuma; is very easily evaporable, without leaving any residuum; effervesces with acids much more strongly than fixed alkali; and forms with them

neutral compounds called *ammoniacal salts*, which we have already described, and which are different according to the nature of the acid made use of; for all volatile alkalis, when perfectly purified, appear to be the very same, without the smallest difference.

Like fixed alkalis, these salts contain a great quantity of fixed air, on which their solidity depends; and which may be so increased as perfectly to neutralize, and deprive them of their peculiar taste and smell. When neutralized by fixed air, they have a very agreeable pungent taste, somewhat resembling that of weak fermenting liquors. When totally deprived of fixed air, by means of lime, they cannot be reduced to a solid form; but are dissipated in an invisible and exceedingly pungent vapour, called by Dr Priestley *alkaline air*. When volatile alkaline salt is dissolved in water, the solution is called a *volatile alkaline spirit*.

Distillation and Purification of Volatile Alkalies.

The materials most commonly used for preparing volatile alkalis are the solid parts of animals, as bones, horns, &c. These are to be put into an iron pot of the shape recommended for solution; (see no 68). To this must be fitted a flat head having a hole in the middle, about two inches diameter. From this a tube of plate-iron must issue, which is to be bent in such a manner, that the extremity of it may enter an oil-jar, through an hole made in its upper part, and dip about half an inch under some water placed in the lower part. The mouth of the jar is to be fitted with a cover, luted on very exactly; and having a small hole, which may be occasionally stopped with a wooden peg. The junctures are to be all luted as close as possible, with a mixture of clay, sand, and some oil; and those which are not exposed to a burning heat, may be further secured by quicklime and the white of an egg, or by means of glue. A fire being now kindled, the air contained in the distilling vessel is first expelled, which is known by the bubbling of the water; and to this vent must be given by pulling out the wooden peg. A considerable quantity of phlegm will then come over, along with some volatile alkali, a great quantity of fixable air, and some oil. The alkali will unite with the water, and likewise some part of the fixed air, the oil swimming above. A great many incoercible vapours, however, will come over, to which vent must be given from time to time, by pulling out the peg. The distillation is to be continued till all is come over; which may be known by the cessation, or very slow bubbling of the water. The iron-pipe must then be separated from the cover of the distilling vessel, lest the liquid in the jar should return into it, on the air being condensed by its cooling. In the jar will be a volatile spirit, more or less strong according as there was less or more water put in, with an exceedingly fetid black oil floating upon it.

The rectification of the volatile alkali is most commodiously performed at once by combining it with an acid; and, as spirit of salt has the least affinity with inflammable matter, it is to be chosen for this purpose, in preference to the vitriolic, or nitrous. As the spirit is excessively oily, though already much weakened by the admixture of the water in the jar, if a very large quantity was not originally put in, an equal

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Whence
obtained.

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Rectifica-
tion.

equal quantity of water may still be added, on drawing off the spirit. That as little may be lost as possible, the spirit should be received in a stone bottle; and the marine acid, likewise in a distilled state, added by little and little, till the effervescence ceases. The liquor, which is now an impure solution of sal ammoniac, is to be left for some time, that the oil may separate itself; it is then to be filtered, evaporated, and crystallized in a leaden vessel. If the crystals are not sufficiently pure at the first, they will easily become so on a second dissolution.

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Volatile sal ammoniac.

From sal ammoniac thus obtained pure, the vitriolic alkali may be extricated by distillation with chalk, alkaline salts, or quicklime. Alkaline salts act more briskly than chalk, and give a much stronger volatile alkali. The strength of this, however, we know, may be altered at pleasure, by adding to, or depriving it of, its natural quantity of fixed air. Hence, perhaps, the best method would be, to prepare volatile alkalies altogether in a fluid state, by means of quicklime; and then add fixed air to them, by means of an apparatus similar to that directed by Dr Priestley for impregnating water with fixed air.

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Cuprum ammoniacale.

Volatile Alkalies combined with Metals.

There are only three metals, *viz.* copper, iron, and lead, upon which, while in their metallic form, volatile alkalies are capable of acting. Copper-salts are dissolved by volatile alkali, especially in their caustic state, into a liquor of a most admirable blue colour. It is remarkable, that this colour depends entirely upon the air having access to this solution: for if the bottle containing it is close stopp'd, the liquor becomes colourless; but, however, resumes its blue colour, on being exposed to the air. On evaporation, a blue saline mass is obtained, which, mixed with fats, or other inflammable matters, tinges their flame green, leaving a red calx of copper, soluble again in volatile spirits as at first. This saline substance has been received into the last edition of the Edinburgh Dispensatory, under the name of *cuprum ammoniacale*, as an antiepileptic.

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Copper, fulminating.

The blue mixture of solution of copper in aqua fortis with volatile spirits, yields sapphire-coloured crystals, which dissolve in spirit of wine, and impart their colour to it. If, instead of crystallization, the liquor be totally evaporated, the remaining dry matter explodes, in a moderate heat, like aurum fulminans. This is given as a fact by Dr Lewis; but hath not succeeded upon trial by Dr Black.

On the other two metals, the action of volatile alkali is by no means so evident: it dissolves iron very slowly into a liquor, the nature of which is not known; and lead is corroded by it into a mucilaginous substance.

Volatile Alkalies combined with Inflammable Substances.

With expressed oils, the caustic volatile alkali unites into a soft unctuous mass, of a very white colour, imperfectly soluble in water; and which is soon decomposed spontaneously. Compositions of this kind are frequently used for removing pains, and sometimes with success. With essential oils, volatile alkalies may be united, either in their dry or liquid form, by means of distillation. The produce is called *sal volatile ole-*

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Sal volatile oleosum.

osum; it is much more frequently used in a liquid than in a dry form. The general method of preparation is by distilling volatile alkali along with essential oils and spirit of wine, or the aromatic substances from whence the essential oils are drawn. These compositions are variable at pleasure; but certain forms are laid down in the dispensaries, with which it is expected that all the chemists should comply in the preparation of these medicines.

Eau de Luce.

This is the name given to an exceedingly volatile spirit, which some years ago was pretty much in vogue; and indeed seems very well calculated to answer all the purposes for which volatile alkalies can be useful. It was of a thick white colour, and smelled somewhat of oil of amber. A receipt appeared in Lewis's dispensatory for the preparation of this fluid, under the name of *spiritus volatilis succinatus*. The method there directed, however, did not succeed; because though the alkaline spirit is capable of keeping a small quantity of oil of amber suspended, the colour is greatly more dilute than that of genuine eau de luce. In the Chemical Dictionary we have the following receipt: "Take four ounces of rectified spirit of wine, and in it dissolve 10 or 12 grains of white soap; filter this solution; then dissolve in it a drachm of rectified oil of amber, and filter again. Mix as much of this solution with the strongest volatile spirit of sal ammoniac, as will be sufficient, when thoroughly shook, to give it a beautiful milky appearance. If upon its surface be formed a cream, some more of the oily spirit must be added."

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Spiritus volatilis succinatus.

This receipt likewise seems insufficient. For the oil of amber does not dissolve in spirit of wine: neither is it probable that the small quantity of soap made use of could be of any service; for the soap would dissolve perfectly in the alkaline spirit, without suffering any decomposition. The only method which we have found to answer is the following. Take an ounce, or any quantity at pleasure, of balsamum Canadense; place it in a small china basin, in a pan of boiling water, and keep it there till a drop of it taken out appears of a resinous consistence when cold. Extract a tincture from this resin with good spirit of wine; and having impregnated your volatile spirit with oil of amber, lavender, or any other essential oil; drop in as much of the spiritous tincture as will give it the desired colour. If the volatile spirit is very strong, the eau de luce will be thick and white, like the cream of new milk; nor is it subject to turn brown with keeping.

Volatile Tincture of Sulphur.

This is a combination of the caustic volatile alkali, or spirit of sal ammoniac, with quicklime. It is usually directed to be made by grinding lime with the sulphur, and afterwards with the sal ammoniac, and distilling the whole in a retort; but the produce is by this method very small, and even the success uncertain. A preferable method seems to be, to impregnate the strongest caustic volatile spirit with the vapour which arises in the decomposition of hepatic sulphur by means of an acid, in the same manner as directed for impregnating water with fixed air. See AIR, n° 49.

This

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Sympathe-
tic ink.

This preparation has a most nauseous fetid smell, which spreads to a considerable distance; and the effluvia will blacken silver or copper, if barely placed in the neighbourhood of the unstopped bottle. This property renders it capable of forming a curious kind of sympathetic ink; for if paper is wrote upon with a solution of saccharum saturni, the writing, which disappears when dry, will appear legible, and of a brownish black, by barely holding it near the mouth of the bottle containing volatile tincture of sulphur. The vapours of this tincture are so exceedingly penetrating, that it is said they will even penetrate through a wall, so as to make a writing with saccharum saturni appear legible on the other side; but this is much to be doubted.

XIV. Of the PHENOMENA resulting from different mixtures of the Acid, Neutral, and Alkaline SALTS, already treated of.

1. If concentrated oil of vitriol is mixed with strong spirit of nitre, or spirit of salt, the weaker acid will become exceedingly volatile, and emit very elastic fumes; so that if a mixture of this kind is put into a close stopp'd bottle, it will almost certainly burst it. The same effect follows upon mixing spirit of salt and spirit of nitre together. In this case, both acids become surprisingly volatile; and much of the liquor will be dissipated in fumes, if the mixture is suffered to stand for any considerable time. Such mixtures ought therefore to be made only at the time they are to be used.

2. If vitriolated tartar is dissolved in an equal quantity of strong spirit of nitre, by heating them together in a matras, the stronger vitriolic acid will be displaced by the weaker nitrous one, and the liquor, on cooling, will shoot into crystals of nitre. The same thing happens also upon dissolving vitriolated tartar, or Glauber's salt, in spirit of salt. This observation we owe to Mons^r Beaumé. It seems to strike directly against the commonly received opinion of an *essential* superiority of strength in the vitriolic acid over the nitrous and marine acids; and would insinuate that one acid displaced another, not according to its *quality* but according to its *quantity*.

3. If vitriolated tartar, or Glauber's salt, is dissolved in water, and this solution mixed with another consisting of calcareous earth, silver, mercury, lead, or tin, dissolved in the nitrous or marine acids, the vitriolic acid will leave the fixed alkali with which it was combined, and, uniting with the calcareous earth or metal, fall with it to the bottom of the vessel. This decomposition takes place only when the vitriolic acid meets with such bodies as it cannot easily dissolve into a liquid, such as those we have just now mentioned: for though vitriolated tartar is mixed with a solution of iron, copper, &c. in the nitrous or marine acids, no decomposition takes place. The case is not altered, whatever acid is made use of; for the marine acid will effectually separate silver, mercury, or lead, from the vitriolic or nitrous acids. This, as well as the last observation, shews us, that the attractive power between acids and alkalis or metals, is exceedingly weakened by water.

4. According to Dr Lewis, if a solution of vitriolated tartar is dropt into lime-water, the acid will unite with the lime, and precipitate with it in an indissoluble

felenite, the alkali remaining in the water in a pure PRAC and caustic state.

5. If green vitriol is mixed with any solution containing substances which cannot be dissolved into a liquid by the vitriolic acid, the vitriol will be immediately decomposed, and the liquor will become a solution of iron only. Thus, if green vitriol is mixed with a solution of saccharum saturni, the vitriolic acid immediately quits the iron for the lead, and falls to the bottom with the latter, leaving the vegetable acid of the saccharum saturni to combine with the iron.

6. If solution of tin in aqua regia is mixed with solution of saccharum saturni, the marine acid quits the tin for the lead contained in the saccharum; at the same time, the acetous acid, which was combined with the lead, is unable to dissolve the tin which was before kept suspended by the marine acid. Hence, both the saccharum saturni, and solution of tin, are very effectually decomposed, and the mixture becomes entirely useless. Dyers and callico-printers ought to attend to this, who are very apt to mix these two solutions together; and no doubt many of the faults of colours dyed or printed in particular places, arise from injudicious mixtures of a similar kind. See DYEING.

7. If mild volatile alkali, that is, such as remains in a concrete form, by being united with a large quantity of fixed air, is poured into a solution of chalk in the nitrous or marine acids, the earth will be precipitated, and a true sal ammoniac formed. If the whole is evaporated to dryness, and a considerable heat applied, the acid will again part with the alkali, and combine with the chalk. Thus, in the purification of volatile alkalis by means of spirit of salt, the same quantity of acid may be made to serve a number of times. This will not hold in volatile spirits prepared with quicklime.

8. If equal parts of sal ammoniac and corrosive sublimate mercury are mixed together and sublimed, they unite in such a manner as never to be separable from one another without decomposition. The compound is called *sal alembroth*: which is said to be a very powerful solvent of metallic substances, gold itself not excepted. Its powers in this, or any other respect, are at present but little known. By repeated sublimations, it is said, this salt becomes entirely fluid, and refuses to arise in the strongest heat.

9. If vitriolic acid is poured upon any salt difficult of solution in water, it becomes then very easily soluble. By this means, vitriolated tartar, or cream of tartar, may be dissolved in a very small quantity of water.

SECT. II. Earths.

THE general divisions and characters of these substances we have given, n^o 33.; and most of their combinations with saline substances have been already mentioned. In this section, therefore, we have to take notice only of their various combinations with one another, with inflammable, or metallic substances, &c. As they do not, however, act upon one another till subjected to a vitrifying heat, the changes then induced upon them come more properly to be treated of under the article GLASS. Upon metallic, and inflammable substances, (sulphur alone excepted), they have very

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Sal ale
broth.

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very little effect; and therefore, what relates to these combinations shall be taken notice of in the following sections. We shall here confine ourselves to some remarkable alterations in the nature of particular earths by combination with certain substances, and to the phosphoric quality of others.

§ 1. Transmutation of FLINTS into an EARTH soluble in acids.

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Solution of
flint.

This is effected by mixing powdered flints with alkaline salt, and melting the mixture by a strong fire. The melted mass deliquesces in the air, like alkaline salts; and if the flint is then precipitated, it becomes soluble in acids, which it entirely resisted before.

In this process the alkali, by its union with the flint, is deprived of its fixed air, and becomes caustic. To this causticity its solvent power is owing; and therefore the flint may be precipitated from the alkali, not only by acids, but by any substance capable of furnishing fixed air; such as magnesia alba, or volatile alkali. The precipitate in both cases proves the same; but the nature of it hath not hitherto been determined. Some have conjectured that the vitriolic acid existed in the flint; in which case, the alkali made use of in this process, ought to be partly converted into vitriolated tartar.

§ 2. Of PHOSPHORIC Earths.

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Bolognian
stone.

These are so called from their property of shining in the dark. The most celebrated and anciently known of this kind is that called the *Bolognian stone*, from Bologna, a city in Italy, near which it is found. The discovery, according to Lémery, was accidentally made by a shoe-maker called Vincenzo Casciarolo; who used to make chemical experiments. This man, having been induced to think, from the great weight and lustre of these stones, that they contained silver, gathered some, and calcined them; when carrying them into a dark place, probably by accident, he observed them shining like hot coals.

Mr Margraaff describes the Bolognian stone to be an heavy, soft, friable, and crystallized substance, incapable of effervescence with acids before calcination in contact with burning fuel. These properties seem to indicate this stone to be of a selenitic or gypseous nature.

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How rendered
luminous.

When these stones are to be rendered phosphoric, such of them ought to be chosen as are the cleanest, best crystallized, most friable and heavy; which exfoliate when broken, and which contain no heterogeneous parts. They are to be made red hot in a crucible; and reduced to a very fine powder in a glass-mortar, or upon a porphyry. Being thus reduced to powder, they are to be formed into a paste with mucilage of gum tragacanth, and divided into thin cakes. These are to be dried with a heat which at last is to be made pretty considerable. An ordinary reverberating furnace is to be filled to three quarters of its height with charcoal, and the fire is to be kindled. Upon this charcoal, the flat surfaces of the cakes are to rest, and more charcoal to be placed above them, so as to fill the furnace. The furnace is then to be covered with its dome, the tube of which is to remain

open; so the coal is to be consumed, and the furnace is to be left cool; the cakes are then to be cleansed from the ashes by blowing with bellows upon them. When they have been exposed during some minutes, to light, and afterwards carried to a dark place, they will seem to shine like hot coals; particularly if the person observing them has been sometime in the dark, or have shut his eyes, that the pupils may be sufficiently expanded. After this calcination through the coals, if the stones be exposed to a stronger calcination, during a full half hour, under a musket, their phosphoric quality will be rendered stronger.

From attending to the qualities of this stone, and the requisites for making this phosphorus, we are naturally led to think, that the Bolognian phosphorus is no other than a composition of sulphur and quicklime. The stone itself, in its natural state, evidently contains vitriolic acid, from its not effervescing with acids of any kind. This acid cannot be expelled from earthy substances by almost any degree of fire, unless inflammable matter is admitted to it. In this case, part of the acid becomes sulphureous, and flies off; while part is converted into sulphur, and combines with the earth. In the above mentioned process, the inflammable matter is furnished by the coals in contact with which the cakes are calcined, and by the mucilage of gum tragacanth with which the cakes are made up. A true sulphur must therefore be formed by the union of this inflammable matter with the vitriolic acid contained in the stone; and part of this sulphur must remain united to the earth left in a calcareous state, by the dissipation, or conversion into sulphur, of its acid.

In the year 1730, a memoir was published by Mr du Fay, wherein he asserts, that all calcareous stones, whether they contain vitriolic acid or not, are capable of becoming luminous by calcination; with this difference only, that the pure calcareous stones require a stronger, or more frequently repeated, calcination to convert them into phosphorus; whereas those which contain an acid, as selenites, gypsum, spar, &c. become phosphoric by a slighter calcination. On the contrary, Mr Margraaff asserts, that no other stones can be rendered phosphoric but those which are saturated with an acid; that purely calcareous stones, such as marble, chalk, limestone, flintalices, &c. cannot be rendered luminous, till saturated with an acid, previously to their calcination.

We have already taken notice, n° 192, 225, that the compounds formed by uniting calcareous earths with the nitrous and marine acids become a kind of phosphori; the former of which emits light in the dark, after having been exposed to the sun through the day; and the latter becomes luminous by being struck. Signior Beccaria found, that this phosphoric quality was capable of being given to almost all substances in nature, metals perhaps excepted. He found that this quality was widely diffused among animals, and that even his own hand and arm possessed it in a very considerable degree. In the year 1775, a treatise on this kind of phosphori was published by B. Wilson, P. R. S. and member of the Royal Academy at Upsal. In this treatise he shews, that oyster-shells, by calcination, acquire the phosphoric quality in a very great degree,

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Analysis of
the phosphorus.342
All calcareous
stones phosphoric,
according to
Mr du Fay.343
Signior Beccaria's
observations.344
Mr Wilson's
experiments.

either

PRACTICE either when combined with the nitrous acid, or without it.

The first experiment made by our author was the pouring some aqua fortis, previously impregnated with copper, on a quantity of calcined oyster-shells, so as to form them into a kind of paste; he put this paste into a crucible, which was kept in a pretty hot fire for about 40 minutes. Having taken out the mass, and waited till it was cool, he presented it to the external light. On bringing it back suddenly into the dark, he was surprised with the appearance of a variety of colours like those of the rainbow, but much more vivid. In consequence of this appearance of the prismatic colours, he repeated the experiment in various ways, combining the calcined oyster-shells with different metals and metallic solutions, with the different acids, alkaline and neutral salts, as well as with sulphur, charcoal, and other inflammable substances; and by all of these he produced phosphori, which emitted variously coloured light.

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Surprising
phosphoric
quality of
oyster-
shells.

What is more remarkable, he found that oyster-shells possessed the phosphoric quality in a surprising degree; and for this purpose nothing more was requisite than putting them into a good sea-coal fire, and keeping them there for some time. On scaling off the internal yellowish surface of each shell, they become excellent phosphori, and exhibit the most vivid and beautiful colours. As we know that neither the vitriolic nor any other acid is contained in oyster-shells, we cannot as yet say any thing satisfactory concerning the nature of this phosphorus.

§ 3. Of the VEGETABLE Earth.

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Dr Lewis's
opinion.

This is produced from vegetables by burning; and, when perfectly pure, by lixiviating the ashes with water, to extract the salt; and then repeatedly calcining them, to burn out all the inflammable matter; and is perhaps the same, from whatever substance it was obtained: in this state, according to Dr Lewis, it is of the same nature with magnesia. In the state, however, in which this earth is procurable by simply burning the plant, and lixiviating the ashes, it is considerably different, according to the different plants from which it is obtained. The ashes of mugwort, small centaury, chervil, and dill, are of a brownish grey; goat's-beard and lungwort afford white ashes; those of fennel are whitish; those of Roman wormwood of a greenish grey; those of rue, agrimony, saxifrage, brown; those of tansy, of a dusky green; those of dodder, of a fine green; eyebright, southern-wood, common wormwood, and scabious, afford them grey; scurvy-grass, of a whitish grey; hyssop, yarrow, and sowbane, of a dusky grey; melilot, and oak-leaves, as also plantain, colts-foot, pine-tops, and fumitory, of a dusky brown; penny-royal, of a pale brown, with some spots of white; elder-flowers, sage, and mother of thyme, afford yellow ashes; those of strawberry-leaves are of a pale brimstone colour; those of cat-mint, of a dusky red; of prunella, brick-coloured; of honey-suckle, blue; of fern, blackish; and those of St John's-wort, feverfew, origanum, and pimpernel, are all of a deep black. The only use to which this kind of earth has yet been put, is that of glass-making and manure. (See GLASS, and AGRICULTURE.)

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Mr Gmelin's ex-
periments.

SECT. III. Of Metallic Substances.

I. GOLD.

THIS metal is reckoned of all others the most perfect and indestructible. When in its greatest purity, it has very little elasticity, is not sonorous, its colour is yellow, it is exceedingly soft and flexible, and is more ductile than any other metal whatever. (See GOLD Leaf, and WIRE-DRAWING.) Of all bodies it is the most ponderous; its gravity being to that of water, according to Dr Lewis, as 19,280, or 19,290, to 1. For its fusion it requires a low degree of white heat, somewhat greater than that in which silver melts. Whilst fluid, it appears of a bluish green colour; when cold, its surface looks smooth, bright, and considerably concave: it seems to expand more in the act of fusion, and to shrink more in its return to solidity, than any of the other metals; whence the greater concavity of its surface. Before fusion it expands the least of all metals, except iron. By sudden cooling it becomes, as well as other metals, brittle; which effect has been erroneously attributed to the contact of fuel during fusion.

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Specific
gravity.

Gold amalgamates very readily with mercury, and mingles in fusion with all the metals. It is remarkably disposed to unite with iron; of which it dissolves many times its own weight, in a heat not much greater than that in which gold itself melts; the mixture is of a silver colour, very brittle, and hard. All the metals, except copper, debase the colour of gold; and, if their quantity is nearly equal to that of the gold, almost entirely conceal it. All but copper and silver destroy its malleability; but none so remarkably as tin and lead; a most minute portion, even the vapour, of these metals, renders gold extremely brittle; though a small proportion of gold forms with them compounds sufficiently ductile; more so than either the lead or tin by themselves. When gold is struck during a certain time by a hammer, or when violently compressed, as by the wire-drawers, it becomes more hard, elastic, and less ductile; so that it is apt to be cracked and torn. Its ductility is, however, restored by the same means used with other metals, namely, heating it red hot, and letting it cool slowly. This is called annealing metals; and gold seems to be more affected by this operation than any other metal. The tenacity of the parts of gold is also very surprising; for a wire of $\frac{1}{2}$ of an inch in diameter will support a weight of 500 pounds.

349
Surprising
tenacity of
its parts.

Gold is unalterable by air, or water. It never contracts rust like other metals. The action of the fiercest furnace-fires occasions no alteration in it. Kunkel kept gold in a glass-house furnace for a month, and Boyle kept some exposed to a great heat for a still longer time, without the loss of a single grain. It is said, however, to be dissipated in the focus of a large burning mirror.

350
Not liable
to rust.

Mr Boyle relates a very curious and extraordinary experiment, which he thought was sufficient to prove the total destructibility of gold. About an eighth part of a grain of powder, communicated by a stranger, was projected upon two drachms of fine gold in fusion, and the matter kept melted for a quarter of an hour.

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Mr Boyle's
experi-
ments for
the destruc-
tion of gold.

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hour. During the fusion, the matter looked like ordinary gold; except only once, that his assistant observed it to look exactly of the colour of opal. When cold, it was of a dirty colour, and, as it were, overcast with a thin coat, almost like half-vitrified litharge: the bottom of the crucible was overlaid with a vitrified substance, partly yellow, and partly reddish brown; with a few small globules, more like impure silver than gold. The metal was brittle, internally like brass, or bell-metal; on the touchstone more like silver than gold: its specific gravity was to that of water only as $15\frac{1}{2}$ to 1. There was no absolute loss of weight. By cupellation, 60 grains of this mass yielded 53 grains of pure gold; with seven grains of a ponderous, fixed, dark-coloured substance.

352.
Solution in
aqua regia.

We have already mentioned, that in certain circumstances gold is soluble in the nitrous and marine acids separately. It is, however, always soluble by the two united, but dissolves slowly even then. The most commodious method of obtaining this solution is, by putting the gold, either in leaves, or granulated, or cut into small thin pieces, into a proper quantity of aqua fortis; then adding, by degrees, some powdered sal ammoniac, till the whole of the gold is dissolved. By this means a much smaller quantity of the menstruum proves sufficient, than if the sal ammoniac was previously dissolved in the aqua fortis; the conflict, which each addition of the salt raises with the acid, greatly promoting the dissolution. Aqua fortis of moderate strength will, in this way, take up about one-third of its weight of gold; whereas an aqua regia, ready prepared from the same aqua fortis, will not take up above one-fifth its weight. Common salt answers better for the preparation of the aqua regia, than sal ammoniac.

353.
Properties
of the solution.

This solution, like all other metallic ones, is corrosive. It gives a violet colour to the fingers, or to any animal matters. If the solution is evaporated and cooled, yellow transparent crystals will be formed: but, if the evaporation is carried too far, the acids with which the gold is combined may be driven from it, by heat alone; and the gold will be left in the state of a yellow powder, called *calx of gold*.

354.
Gold precipitated
from it.

Gold may be precipitated from its solution by those substances which commonly precipitate metals, such as alkaline salts, and calcareous earths. It may also be precipitated in a fine purple powder, by tin, or its solution.

When fixed alkalies are made use of, the precipitate weighs about one-fourth more than the gold employed. With volatile alkalies also, if they are added in no greater proportion than is sufficient to saturate the acid, the quantity of precipitate proves nearly the same: but if volatile spirit is added in an over-proportion, it re-dissolves part of the gold which it had before precipitated, and the liquor becomes again considerably yellow. The whole of the precipitate, however, could not be re-dissolved, either by the mild or caustic alkali; nor did either of these spirits sensibly dissolve, or extract any tinge from precipitates of gold which had been thoroughly edulcorated with boiling water.

All the metallic bodies which dissolve in aqua regia, precipitate gold from it. Mercury and copper throw

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down the gold in its bright metalline form; as the others, in that of a calx or powder, which has no metallic aspect. Vitriol of iron, though it precipitates gold, yet has no effect upon any other metal; hence it affords an easy method of separating gold from all other metals. The precipitation with tin succeeds certainly, only when the metal in substance is used, and the solution of gold largely diluted with water. It is observable, that though the gold is precipitated from the diluted solution by tin, yet, if the whole is suffered to stand till the water has in a great measure exhaled, the gold is taken up afresh, and only a white calx of tin remains.

If gold is precipitated from its solution in aqua regia, by a volatile alkali, the precipitate will explode with a prodigious force and noise if too strongly heated. This preparation is called *aurum fulminans*. The reason of this explosion probably is, the sudden expansion of the fixed air contained in the calx, occasioned by the deflagration of a small quantity of nitrous ammoniacal salt produced during the precipitation.

The explosion of aurum fulminans is one of the most violent known in chemistry. The report is preceded by a flash, visible in the dark; and, during the explosion, the gold is revived into little granules, which may be caught by a proper apparatus. It is not necessary that fulminating gold should be touched by an ignited body, or made red hot, in order to make it explode. The heat requisite for this purpose, is intermediate between that of boiling water and the heat which makes metals of an obscure red colour. If a little of it is laid upon a smooth piece of metal, and then heated so as to explode, the vehement quickness and strength of the explosion will make a small hollow in the metal. From this it has been thought that fulminating gold directed its force only, or chiefly, downwards. This, however, seems not to be the case; but rather, that it acts equally in all directions. Friction, likewise, and even a friction that is not very considerable, is sufficient to make this substance explode; and these circumstances render fulminating gold very dangerous. The author of the Chemical Dictionary relates the following accident, to which he says he was witness: "A young man who worked in a laboratory, had put a drachm of fulminating gold into a bottle, and had neglected to wipe the inner surface of the neck of the bottle, to which some of the powder adhered. When he endeavoured to close the bottle, the turning of the glass stopper round, in order to make it fit more closely, occasioned such a friction, that heat enough was produced to make part of the powder explode. By this explosion the young man was thrown some steps behind, his face and hands were wounded by the fragments of the bottle, and his eyes were put out. Notwithstanding this violent explosion, the whole drachm of fulminating gold certainly was not exploded; for much of it was afterwards found scattered about the laboratory." Of this mischievous quality the gold may easily be deprived, by boiling it in oil of vitriol, or mixing it with sulphur, and burning away the sulphur.

If gold is melted with an hepar sulphuris, composed of equal parts of sulphur and fixed alkaline salt, the

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355
Separated from other
metals by
vitriol of
iron.

356
Aurum fulminans.

357
Explodes
by friction.

358
Deprived of its fulminating
property.

359
Solution of
gold by hepar
sulphuris.

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metal readily unites with it into an uniform mass, capable of dissolution in water without any separation of its parts. The solution, besides a nauseous taste from the sulphur, has a peculiar penetrating bitterness, not discoverable in any other metalline solution made by the same means.

Though the compositions of sulphur and alkali seem to unite more intimately with gold than any other metal, their affinity with it is but slight; copper, or iron, added to the matter in fusion, disunite, and precipitate the gold. The metal thus recovered, and purified by the common processes, proves remarkably paler-coloured than at first. In an experiment related by Dr Brandt, in the Swedish Memoirs, the purified gold turned out nearly as pale as silver, without any diminution of weight.

360
Medical
virtues of
gold.

Gold has been thought to be possessed of many extraordinary virtues as a medicine; which, however, are long ago determined to be only imaginary. It is not indeed very easy to prepare this metal in such a manner that it can be safely taken into the human body. The solution in aqua regia is poisonous; but if any essential oil is poured on this solution, the gold will be separated from the acid, and united to the essential oil, with which, however, it contracts no lasting union, but in a few hours separates in bright yellow phlegm to the sides of the glass. Vitriolic ether dissolves the gold more readily and perfectly than the common essential oils; and keeps it permanently suspended, the acid liquor underneath appearing colourless. The yellow ethereal solution poured off, and kept for some time in a glass stoped with a cork, so that the spirit may slowly exhale, yields long, transparent, prismatic crystals, in shape like those of nitre, and yellow like topaz. What the nature of these crystals is, either as to medicinal effects, or other purposes, is as yet unknown.

361
Ethereal so-
lution.

Rectified spirit of wine mingles uniformly with the solution of gold made in acids; if the mixture is suffered to stand, for some days, in a glass slightly covered, the gold is by degrees revived, and arises in bright pellicles to the surface. Grosser inflammable matters, wine, vinegar, solutions of tartar, throw down the gold, in its metalline form, to the bottom. Gold is the only metal which is thus separable from its solution in acids by these substances; and hence gold may be purified by these means from all admixtures, and small proportions of it in liquors readily discovered.

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Colour of
gold re-
solved.

When the colour of gold is by any means rendered pale, it may be recovered again by melting it with copper, and afterwards separating the copper; or by a mixture of verdigrease and sal ammoniac with vitriol or nitre. The colour is also improved by fusion with nitre, injecting sal ammoniac upon it in the fusion, quenching it in urine, or boiling it in a solution of alum. When borax is used as a flux, it is customary to add a little nitre or sal ammoniac, to prevent its being made pale by the borax. Juncker reports, that by melting gold with four times its weight of copper, separating the copper by aqua fortis unpurified, then melting the gold with the same quantity of fresh copper, and repeating this process eight or nine times, the gold becomes at length of a deep red colour, which sustains the action of lead, antimony, and aqua fortis.

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2. SILVER.

This, next to gold, is the most perfect, fixed, and ductile of all the metals. Its specific gravity is to that of water nearly as 11 to 1. A single grain has been drawn into a wire three yards long, and flattened into a plate an inch broad. In common fires it suffers no diminution of its weight; and, kept in the vehement heat of a glass-house for a month, it loses no more than one sixty-fourth. In the focus of a large burning-glass, it smokes for a long while, then contracts a greyish ash on the surface, and at length is totally dissipated.

363 -
Ductility
of silver.

Silver is somewhat harder and more sonorous than gold, and is fusible with a less degree of heat. The tenacity of its parts also is nearly one half less than that of gold; a silver wire of $\frac{1}{8}$ of an inch diameter being unable to bear more than 270 pounds.

Mercury unites very readily with silver-leaf, or with the calx of silver precipitated by copper; but does not touch the calces precipitated by alkaline salts. The vapours of sulphureous solutions stain silver yellow or black. Sulphur, melted with silver, debases its colour to a leaden hue, renders it more easily fusible than before, and makes it flow thin as to be apt in a little time to penetrate the crucible: in a heat just below fusion, a part of the silver shoots up, all over the surface, into capillary efflorescences. Aqua fortis does not act upon silver in this compound; but fixed alkaline salts will absorb the sulphur, and form a hepar sulphuris, which, however, is capable of again dissolving the metal. If the sulphurated silver is mixed with mercury sublimata, and exposed to the fire, the mercury of the sublimate will unite with the sulphur, and carry it up in the form of cinnabar, whilst the marine acid of the sublimate unites with the silver, into a luna cornea, (see n° 239), which remains at the bottom of the glass. Fire alone is sufficient, if continued for some time, to expel the sulphur from silver.

364 -
Effects of
sulphur on.

From the baser metals, silver is purified by cupellation with lead. (See REFINING.) It always retains, however, after that operation, some small portion of copper, sufficient to give a blue colour to volatile spirits, which has been erroneously thought to proceed from the silver itself. It is purified from this admixture by melting it twice or thrice with nitre and borax. The scoria, on the first fusion, are commonly blue; on the second, green; and on the third, white, which is a mark of the purification being completed.

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Purificati-
on.

The most effectual means, however, of purifying silver, is by reviving it from luna cornea; because spirit of salt will not precipitate copper as it does silver. The silver may be recovered from luna cornea, by fusion with alkaline and inflammable fluxes; but, in these operations, some loss is always occasioned by the dissipation of part of the volatile calx, before the alkali or metal can absorb its acid.

366
Luna cor-
nea redu-
ced.

Mr Margraaf has discovered a method of recovering the silver with little or no loss; mercury assailed by volatile salts, inhibiting it by trituration without heat. One part of luna cornea, and two of volatile salt, are to be ground together in a glass-mortar, with so much water as will reduce them to the consistence of a thin paste, for a quarter of an hour or more; five parts of pure

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Mr Mar-
graaf's me-
thod.

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pure quicksilver are then to be added, with a little more water, and the triture to be continued for some hours. A fine amalgam will thus be obtained; which is to be washed with fresh parcels of water, as long as any white powder separates. Nearly the whole of the silver is contained in the amalgam, and may be obtained perfectly pure by distilling off the mercury. The white powder holds a small proportion separable by gentle fublimation; the matter which sublimes is nearly similar to *mercurius dulcis*.

The colour of silver is debased by all the metals, and its malleability greatly injured by all but gold and copper. The English standard-silver contains one part of copper to twelve and one-third of pure silver. This metal discovers in some circumstances a great attraction for lead; though it does not retain any of that metal in cupellation. If a mixture of silver and copper be melted with lead in certain proportions, and the compound afterwards exposed to a moderate fire, the lead and silver will melt out together, bringing very little of the copper with them; by this means silver is often separated from copper in large works. The effect does not wholly depend upon the different fusibility of the metals; for if tin, which is still more fusible than lead, be treated in the same manner with a mixture of silver and copper, the three ingredients are found to attract one another so strongly as to come all into fusion together. Again, if silver be melted with iron, and lead added to the mixture, the silver will forsake the iron to unite with the lead, and the iron will float by itself on the surface.

Silver is purified and whitened externally by boiling in a solution of tartar and common salt. This is no other than an extraction of the cupreous particles from the surface of the silver, by the acid of the tartar acted by the common salt.

3. COPPER.

This is one of those metals, which, from their destructibility by fire, and contracting rust in the air, are called *impure*. Of these, however, it is the most perfect and indestructible. It is of a reddish colour when pure; easily tarnishes in a moist air, and contracts a green rust. It is the most sonorous of all the metals, and the hardest and most elastic of all but iron. In some of its states, copper is as difficultly extended under the hammer as iron, but always proves softer to the file; and is never found hard enough to strike a spark with flint or other stones; whence its use for chisels, hammers, hoops, &c. in the gunpowder works. When broke by often bending backwards and forwards, it appears internally of a dull red colour without any brightness, and of a fine granulated texture, resembling some kinds of earthen ware. It is considerably ductile, though less so than either gold or silver; and may be drawn into wire as fine as hair, or beaten into leaves almost as thin as those of silver. The tenacity of its parts is very considerable; for a copper wire of $\frac{1}{4}$ of an inch diameter will support a weight of 209 pounds without breaking. The specific gravity of this metal, according to Dr Lewis, is to that of water as 8.830 to 1.

Copper continues malleable when heated red; in which respect it agrees with iron; but is not, like iron,

capable of being welded, or having two pieces joined into one. It requires for its fusion a stronger heat than either gold or silver, though less than that requisite to melt iron. When in fusion, it is remarkably impatient of moisture; the contact of a little water occasioning the melted copper to be thrown about with violence, to the great danger of the by-standers. It is, nevertheless, said to be granulated in the brass-works at Bristol, without explosion or danger, by letting it fall in little drops, into a large cistern of cold water covered with a brass-plate. In the middle of the plate is an aperture, in which is secured with Sturbridge clay a small vessel, whose capacity is not above a spoonful, perforated with a number of minute holes, through which the melted copper passes. A stream of cold water passes through the cistern. It suffered to grow hot, the copper falls liquid to the bottom, and runs into plates.

Copper, in fusion, appears of a bluish green colour, nearly like that of melted gold. Kept in fusion for a long time, it becomes gradually more and more brittle; but does not scorch considerably, nor lose much of its weight. It is much less destructible than any of the imperfect metals, being very difficultly subdued even by lead or bismuth. If kept in a heat below fusion, it contracts on the surface thin powdery scales; which, being rubbed off, are succeeded by others, till the whole quantity of the metal is thus changed into a scoria or calx, of a dark reddish colour. This calx does not melt in the strongest furnace fires; but, in the focus of a large burning mirror, runs easily into a deep red, and almost opaque, glass. A flaming fire, and strong draught of air over the surface of the metal, greatly promote its calcination. The flame being tinged of a green, bluish, or rainbow colour, is a mark that the copper burns.

This metal is very readily soluble by almost all alkaline substances; even common water, suffered to stand long in copper-vessels, extracts so much as to gain a coppery taste. It is observable, that water is much more impregnated with this taste, on being suffered to stand in the cold, than if boiled for a longer time in the vessel. The same thing happens in regard to the mild vegetable acids. The confectioners prepare the most acid syrups, even those of lemons and oranges, by boiling in clean copper-vessels, without the preparations receiving any ill taste from the metal; whereas, either the juices themselves, or the syrups made from them, if kept cold in copper-vessels, soon become impregnated with a disagreeable taste, and with the pernicious qualities of the copper.

By combination with vegetable acids, copper becomes in some respects remarkably altered. Verdigris, which is a combination of copper with a kind of acetic or tartarous acid, is partially soluble in distilled vinegar; the residuum, on being melted with borax and linseed oil, yields a brittle metallic substance, of a whitish colour, not unlike bell-metal. The copper also, when revived from the distilled verdigris, was found by Dr Lewis to be different from the metal before dissolution; but neither of these changes have yet been sufficiently examined.

Copper, in its metallic state, is very difficultly amalgamated with mercury; but unites with it more easily

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371
How granulated.

372
Calced.

373
Solubility.

374
Altered by combination with vegetable acids.

375
Amalgamation with mercury.

268
Attraction for lead.

269
Whitened externally.

370
Always softer than iron.

PRACTICE fily if divided by certain admixtures. If mercury and verdigrease be triturated together with common salt, vinegar, and water, the copper in the verdigrease will be imbibed by the mercury, and form with it, as Boyle observes, a curious amalgam, at first so soft as to receive any impression, and which, on standing, becomes hard like brittle metals. Brads-leaf likewise gives out its copper to mercury, the other ingredient of the brads separating in the form of powder.

376
Dr Lewis's
method.

Easier methods of amalgamating copper are published by Dr Lewis in his notes on Willon's chemistry, p. 432. His receipts are,—“ Dissolve some fine copper in aqua fortis: when the menstruum will take up no more of the metal, pour it into an iron mortar, and add six times the weight of the copper, of mercury, and a little common salt: grind the whole well together with an iron pestle; and, in a little time, the copper will be imbibed by the mercury, and an amalgam formed, which may be rendered bright by washing it well with repeated additions of water.

Another method. Take the muddy sublance which is procured in the polishing of copper plates with a pumice stone, and grind it well with a suitable portion of mercury, a little common salt, and some vinegar, in an iron mortar, (a marble one will do, if you make use of an iron pestle,) till you perceive the mercury has taken up the copper.” The copper recovered from these amalgams retains its original colour, without any tendency to yellow. Even when brads is made use of for making the amalgam, the recovered metal is perfect red copper; the ingredient from which the brads received its yellowness being, as above observed, separated in the amalgamation.

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Brads, how
prepared.

Copper is the basis of several metals for mechanic uses; as brads, prince's metal, bell-metal, bath-metal, white copper, &c. Brads is prepared from copper and calamine, with the addition of powdered charcoal, cemented together, and at last brought into fusion. The calamine is to be previously prepared by cleansing it from adhering earth, stone, or other matters; by roasting, or calcining it; and by grinding it into a fine powder. The length of time, and degree of heat, requisite for the calcination of the calamine, are different according to the qualities of that mineral. The calamine, thus calcined, cleansed, and ground, is to be mixed with about a third or fourth part of charcoal dust, or powdered pit-coal, as is done in some parts of England. The malleability of the brads is diminished by the use of pit-coal, which is therefore only employed for the preparation of the coarser kinds. To this composition of calamine and coal, some manufacturers add common salt, by which the process of making brads is said to be hastened. In Gossard, where the calamine adhering to the insides of the furnaces is used instead of the native calamine, a small quantity of alum is added, by which they pretend the colour of the brads is heightened. With this composition, and with thin plates or grains of copper, the crucibles are to be nearly filled. The proportion of the calamine to the copper varies according to the richness of the former, but is generally as three to two. The copper must be dispersed through the composition of calamine and coal; and the whole must be covered with more coal, till the crucibles are full. The crucibles,

PRACTICE thus filled, are to be placed in a furnace sunk in the ground, the form of which is that of the frustum of a hollow cone. At the bottom of the furnace, or greater basis of the frustum, is a circular grate, or iron-plate. This plate is covered with a coat of clay and horse-dung, to defend it from the action of the fire; and pierced with holes, through which the air maintaining the fire passes. The crucibles stand upon the circular plate, forming a circular row, with one in the middle. The fuel is placed betwixt the crucibles, and is thrown into the furnace at the upper part of it, or the lesser basis of the frustum. To this upper part or mouth of the furnace is fitted a cover made of bricks or clay, kept together with bars of iron, and pierced with holes. This cover serves as a register. When the heat is to be increased, the cover must be partly or entirely taken off, and a free draught is permitted to the external air, which passes along a vault under-ground to the ash-hole, through the holes in the circular grate or plate, betwixt the crucibles, and through the upper mouth, along with the smoke and flame, into an area where the workmen stand, which is covered with a large dome or chimney, through which the smoke and air ascend. When the heat is to be diminished, the mouth of the furnace is closed with the lid; through the holes of which the air, smoke, and flame pass. The crucibles are to be kept red-hot during eight or ten hours; and in some places much longer, even several days, according to the nature of the calamine. During this time, the zinc rises in vapour from the calamine, unites with the copper, and renders that metal considerably more fusible than it is by itself. To render the metal very fluid, that it may flow into one uniform mass at the bottom, the fire is to be increased a little before the crucibles are taken out, for pouring off the fluid metal into molds. From 60 pounds of good calamine, and 40 of copper, 60 pounds of brads may be obtained, notwithstanding a considerable quantity of the zinc is dissipated in the operation. The quantity of brads obtained has been considerably augmented since the introduction of the method now commonly practised, of granulating the copper; by which means a larger surface of this metal is exposed to the vapour of zinc, and consequently less of that vapour escapes. To make the finer and more malleable kinds of brads, besides the choice of pure calamine and pure copper, some manufacturers cement the brads a second time with calamine and charcoal; and sometimes add to it old brads, by which the new is said to be meliorated.

Brads is brittle when hot; but so ductile when cold, that it may be drawn into very fine wire, and beat into very thin leaves. Its beautiful colour, malleability, and its fusibility, by which it may be easily cast into moulds, together with its being less liable to rust than copper, render it fit for the fabrication of many utensils.

Although zinc be fixed to a certain degree in brads, by the adhesion which it contracts with the copper; yet when brads is melted, and exposed to a violent fire, during a certain time, the zinc dissipates in vapours, and even flames away, if the heat be strong enough; and if the fire is long enough continued, all the zinc will be evaporated and destroyed, so that what remains is copper.

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Princes me-
tal.

Prince's metal is made by melting zinc in substance with copper; and all the yellow compound metals prepared in imitation of gold, are no other than mixtures of copper with different proportions of that ferri-metal, taken either in its pure state, or in its natural ore calamine, with an addition sometimes of iron-slings, &c. Zinc itself unites most easily with the copper; but calamine makes the most ductile compound, and gives the yellowest colour. Dr Lewis observes, that a little of the calamine renders the copper pale; that when it has imbibed about $\frac{1}{5}$ its own weight, the colour inclines to yellow; that the yellowness increases more and more, till the proportion comes to almost one half; that on further augmenting the calamine, the compound becomes paler and paler, and at last white. The crucibles, in which the fusion is performed in large works, are commonly tinged by the matter of a deep blue colour.

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Bell-metal.

Bell-metal is a mixture of copper and tin; though both these metals finely are malleable, the compound proves extremely brittle. Copper is dissolved by melted tin easily and intimately, far more so than by lead. A small portion of tin renders this metal dull-coloured, hard, and brittle. Bell-metal is composed of about ten parts of copper to one of tin, with the addition commonly of a little brass or zinc. A small proportion of copper, on the other hand, improves the colour and consistency of tin, without much injuring its ductility. Pewter is sometimes made from one part of copper, and twenty or more of tin.

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Dr Lewis's
observations on the
specific gra-
vity of the
metal.

It has long been observed, that though tin is specifically much lighter than copper, yet the gravity of the compound, bell-metal, is greater than that of the copper itself. The same augmentation of gravity also takes place where the lighter metal is in the greatest proportion; a mixture even of one part of tin with two of copper, turning out specifically heavier than pure copper. Most metallic mixtures answer to the mean gravity of the ingredients, or such as would result from a bare addition of parts. Of those tried by Dr Lewis, some exceeded the mean, but the greater number fell short of it; tin and copper were the only ones that formed a compound heavier than the heaviest of the metals separately.

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White cop-
per.

White copper is prepared by mixing together equal parts of arsenic and nitre, injecting the mixture into a red-hot crucible, which is to be kept in a moderate fire, till they subside, and flow like wax. One part of this mixture is injected upon four parts of melted copper, and the metal, as soon as they appear thoroughly united together, immediately poured out. The copper, thus whitened, is commonly melted with a considerable proportion of silver, by which its colour is both improved and rendered more permanent. The white copper of China and Japan appears to be no other than a mixture of copper and arsenic. Geoffroy relates, that, on repeated fusions, it exhaled arsenical fumes, and became red copper, losing with its whiteness, one seventh of its weight.

4. IRON.

Iron is a metal of a greyish colour; soon tarnishing in the air into a dusky blackish hue; and in a short time contracting a yellowish, or reddish rust. It is the hard-

est of all metals; the most elastic; and, excepting platinum, the most difficult to be fused. Next to gold, iron has the greatest tenacity of parts; an iron wire, the diameter of which is the tenth part of an inch, being its capable of sustaining 450 pounds. Next to tin, it is the lightest of all the metals, losing between a seventh and eighth part of its weight when immersed in water. When very pure, it may be drawn into wire as fine as horse-hair; but is much less capable of being beaten into thin leaves than the other metals, excepting only lead.

Iron grows red-hot much sooner than any other metal; and this, not only from the application of actual fire, but likewise from strong hammering, friction, or other mechanic violence. It nevertheless melts the most difficultly of all metals except platinum; requiring, in its most fusible state, an intense, bright, white heat. When perfectly malleable, it is not fusible at all by the heat of furnaces, without the additions or the immediate contact of burning fuel; and, when melted, loses its malleability: all the common operations which communicate one of these qualities deprive it at the same time of the other; as if fusibility and malleability were in this metal incompatible. When exposed to the focus of a large burning mirror, however, it quickly fused, boiled, and emitted an ardent fume, the lower part of which was a true flame. At length it was changed into a blackish, vitrified scoria.

From the great waste occasioned by exposing iron to a red but especially to a white heat, this metal appears to be a combustible substance. This combustion is maintained, like that of all other combustible substances, by contact of air. Dr Hook, having heated a bar of iron to that degree called white heat, he placed it upon an anvil, and blowed air upon it by means of bellows, by which it burnt brighter and hotter. Exposed to a white heat, it contracts a semi-vitreous coat, which bursts at times, and flies off in sparkles. No other metallic body exhibits any such appearance. On continuing the fire, it changes by degrees into a dark red calx, which does not melt in the most vehement heat procurable by furnaces, and, if brought into fusion by additions, yields an opaque black glass. When strongly heated, it appears covered on the surface with a soft vitreous matter like varnish. In this state pieces of it cohere; and, on being hammered together, weld, or unite, without discovering a juncture. As iron is the only metal which exhibits this appearance in the fire, so it is the only one capable of being welded. Those operations which prevent the superficial scorification, deprive it likewise of this valuable property: which may be restored again, by suffering the iron to resume its vitreous aspect; and, in some measure, by the interposition of foreign vitreifiable matters; whilst none of the other metals will unite in the smallest degree, even with its own scoria.

Iron expands the least of all metals by heat. In the act of fusion, instead of continuing to expand, like the other metals, it shrinks; and thus becomes so much more dense as to throw up such part as is unmelted, to the surface; whilst pieces of gold, silver, copper, lead, or tin, put into the respective metals in fusion, sink freely to the bottom. In its return to a consistent state, instead of shrinking like the other metals, it expands;

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Tenacity of
its parts.383
Iron com-
bustible
substances384
Only metal
capable of
being weld-
ed.385
Contracts
in fusion.

PRACTICE expands; sensibly rising in the vessel, and assuming a convex surface, while the others become concave. This property, first observed by Reaumur, excellently fits it for receiving impressions from moulds. By the increase of bulk which the metal receives in congelation, it is forced into the minutest cavities, so as to take the impression far more exactly than the other metals which shrink.

386
Dissolved
by all me-
tals except
lead and
mercury.

Iron is dissolved, by all the metals made fluid, except lead; though none of them act so powerfully upon it as gold: but, as Cramer observes, if the iron contains any portion of Sulphur, it can scarcely be made to unite at all with gold.

Among the semi-metallic bodies, it is averse to an union with mercury; no method of amalgamating these two having yet been discovered; though quicksilver, in certain circumstances, seems in some small degree to act upon it. A plate of tough iron, kept immersed in mercury for some days, becomes brittle; and mercury will often adhere to and coat the ends of iron pestles used in triturating certain amalgams with saline liquors.

Next to mercury, zinc is the most difficultly combined with iron; not from any natural indisposition to unite, but from the zinc being difficultly made to sustain the heat requisite. The mixture is hard, somewhat malleable, of a white colour approaching to that of silver. Regulus of antimony, as soon as it melts, begins to act on iron, and dissolves a considerable quantity. If the regulus be stirred with an iron rod, it will melt off a part of it. Arsenic likewise easily mingles with iron, and has a strong attraction for it; forsaking all the other metals, to unite with this. It renders the iron white, very hard, and brittle.

387
Prussian
blue.

This metal is the basis of the fine blue pigment, called, from the place where it was first discovered, *Berlin* or *Prussian* blue. This colour was accidentally discovered about the beginning of the present century, by a chemist of Berlin, who, having successively thrown upon the ground several liquors from his laboratory, was much surprised to see it suddenly stained with a beautiful blue colour. Recollecting what liquors he had thrown out, and observing the same effects from a similar mixture, he prepared the blue for the use of painters; who found that it might be substituted to ultramarine, and accordingly have used it ever since.

388
Dr Woodward's
receipt for.

Several chemists immediately endeavoured to discover the composition of this pigment; and, in the year 1724, Dr Woodward published the following process, in the *Philosophical Transactions*, for making it. "Alkalis together four ounces of nitre, and as much tartar; (See n° 220). Mix this alkali well with four ounces of dried bullocks blood; and put the whole in a crucible covered with a lid, in which there is a small hole. Calcine with a moderate heat, till the blood be reduced to a perfect coal; that is, till it emits no more smoke or flame capable of blackening any white bodies that are exposed to it. Increase the fire towards the end, so that the whole matter contained in the crucible shall be moderately, but sensibly, red.

"Throw into two pints of water the matter contained in the crucible, while yet red, and give it half an hour's boiling: decant this first water; and pour more upon the black charry coal, till it becomes almost

insipid. Mix together all these waters; and reduce them, by boiling, to about two pints.

"Dissolve also two ounces of martial vitriol, and eight ounces of alum, in two pints of boiling water. Mix this solution when hot with the preceding lixivium also hot. A great effervescence will then be made: the liquors will be rendered turbid; and will become of a green colour, more or less blue; and a precipitate will be formed of the same colour. Filtrate, in order to separate this precipitate; upon which pour spirit of salt, and mix them well together; by which means the precipitate will become of a fine blue colour. It is necessary to add rather too much of the salt than too little, and till it no longer increases the beauty of the precipitate. The next day wash this blue, till the water comes off from it insipid; and then gently dry it."

Mr Geoffroy was the first who gave any plausible theory of this process, or any rational means of improving it. He observes, that the Prussian blue is no other than the iron of the vitriol revived by the inflammable matter of the alkaline lixivium, and perhaps a little brightened by the earth of alum; that the green colour proceeds from a part of the yellow ferruginous calx, or ochre, unrevived, mixing with the blue; and that the spirit of salt dissolves this ochre more readily than the blue part; though it will dissolve that also by long standing, or if used in too large quantity. From these principles, he was led to increase the quantity of inflammable matter; that there might be enough to revive the whole of the ferruginous ochre, and produce a blue colour at once, without the use of the acid spirit. In this he perfectly succeeded; and found, at the same time, that the colour might be rendered of any degree of deepness, or lightness, at pleasure. If the alkali is calcined with twice its weight of dried blood, and the lixivium obtained from it poured into a solution of one part of vitriol to six of alum, the liquor acquires a very pale blue colour, and deposits as pale a precipitate. On adding more and more of a fresh solution of vitriol, the colour becomes deeper and deeper, almost to blackness. He imagines with great probability, that the blue pigment, thus prepared, will prove more durable in the air, mingle more perfectly with other colours, and be less apt to injure the lustre of such as are mixed with or applied in its neighbourhood, than that made in the common manner; the tarnish to which common Prussian blue is subject, seeming to proceed from the acid, which cannot be separated by any abluion.

He takes notice of an amusing phenomenon, which happens upon mixture. When the liquors are well stirred together; and the circular motion, as soon as possible, stopped; some drops of solution of vitriol, (depurated by long settling), let fall on different parts of the surface, divide, spread, and form curious representations of flowers, trees, shrubs, flying insects, &c. in great regularity and perfection. These continue 10 or 12 minutes: and on stirring the liquor again, and dropping in some more of the solution of vitriol, are succeeded by a new picture.

This theory is confirmed by Mr Macquer, in a *Mc-Mac-moir* printed in the year 1752. He observes, that the quantity of phlogiston communicated to the iron

PRACTICE in this process is so great, as not only to cause the metal resist in a great measure the action of acids, and become totally unaffected by the magnet; but by a slight calcination it becomes entirely similar to other iron, and is at once deprived of its blue colour. He further observes, that fire is not the only means by which Prussian blue may be deprived of all the properties which distinguish it from ordinary iron. A very pure alkali produces the same effect. He has also discovered, that the alkali which has thus deprived the Prussian blue of all the properties which distinguish it from ordinary iron, becomes, by that operation, entirely similar to the phlogisticated alkali used for the preparation of Prussian blue.

292
Phlogisticated alkali loses its alkaline properties.

By a more particular examination, he found, that the alkali might become perfectly saturated with the colouring matter; so that, when boiled on Prussian blue, the alkali extracted none of its colour. When the salt was thus perfectly saturated, it seemed no longer to possess any alkaline qualities. If poured into a solution of iron in any acid, a single, homogeneous, and perfect precipitate was formed; not green, as in Dr Woodward's process, but a perfect Prussian blue; which needed no acid to brighten its colour. A pure acid added to the alkali was not in the least neutralized, nor in the least precipitated the colouring matter. From hence Mr Macquer concludes, that, in the making of Prussian blue, vitriol is decomposed; because the iron has a strong attraction for the colouring matter, as well as the acid for the alkali; and the sum of the attraction of the acid to the alkali, joined to that of the iron for the colouring matter, is greater than the single attraction of the acid to the metal.

293
Earths do not attract the colouring matter.

Another very important phenomenon is, that earths have not the same attraction for this colouring matter that metallic substances have. Hence, if an alkali saturated with this colouring matter be poured into a solution of alum, no decomposition is effected, nor any precipitate formed. The alum continues alum, and the alkali remains unchanged. From this experiment Mr Macquer concludes that alum does not directly contribute to the formation of the Prussian blue. The purpose he thinks it answers is as follows. Fixed alkaline salts can never be perfectly saturated with phlogistic matter by calcination; alkalies, therefore, though calcined with inflammable substances, so as to make a proper lixivium for Prussian blue, remains still alkaline. Hence, when mixed with a solution of green vitriol, they form, by their purely alkaline part, a yellow precipitate, so much more copious, as the alkali is less saturated with phlogiston. But nothing is more capable of spoiling the fine colour of the Prussian blue, than an admixture of this yellow precipitate: it is therefore necessary to add a quantity of alum, which will take up the greatest part of the purely alkaline salt; and, of consequence, the quantity of yellow ferruginous precipitate is much diminished. But the earth of alum, being of a fine shining white, does not in the least alter the purity of the blue colour, but is rather necessary to dilute it. From all this it follows, that it is a matter of indifference whether the green precipitate is to be again dissolved by an acid, or the alkaline part of the lixivium saturated with alum, or with an acid, before the precipitate is formed. The latter indeed

seems to be the most eligible method.

Most alkalies obtained from the ashes of vegetables, being combined, by their combustion, with a portion of inflammable matter, are capable of furnishing a quantity of Prussian blue, proportionable to the quantity of colouring matter they contain, even without the necessity of mixing them with a solution of iron; because they always contain a little of this metal dissolved, some of which may be found in almost all vegetables; therefore, it is sufficient to saturate them with an acid. Henckel observed the production of this blue in the saturation of the fossil alkali, and recommended to chemists to inquire into its nature.

Iron desigrates with nitre, and renders the salt alkaline and caustic. A part of the iron is thus rendered soluble, along with the alkaliized salt. A mixture of equal parts of iron filings and nitre, injected into a strongly heated crucible, and, after the detonation, thrown into water, tinges the liquor of a violet or purplish blue colour. This solution, however, is not permanent. Though the liquor at first passes through a filter, without any separation of the iron; yet, on standing for a few hours, the metal falls to the bottom, in form of a brick-coloured powder. Volatile alkalies instantly precipitate the iron from this fixed alkaline solution.

Iron readily unites with sulphur; and when combined with it, proves much easier of fusion than by itself. A mixture of iron filings and sulphur, moistened with water, and pressed down close, in a few hours swells and grows hot; and, if the quantity is large, bursts into flame.

By cementation with inflammable matters, iron imbibes a larger quantity of phlogiston; and becomes much harder, less malleable, and more fusible. It is then called *steel*. See METALLURGY, and STEEL.

5. LEAD.

Lead is a pale or livid-white metal, soon losing its brightness in the air, and contracting a blackish or greyish ash-colour. It is the softest and most flexible of all metallic bodies; but not ductile to any great degree, either in the form of wire, or leaf; coming far short, in this respect, of all other metals. It has also the least tenacity of all metallic bodies; a leaden wire of $\frac{1}{8}$ of an inch diameter being capable of supporting only 29½ pounds. Lead has, however, a considerable specific gravity; losing, when immersed in water, between $\frac{1}{7}$ and $\frac{1}{8}$ of its weight. It is of all metals the most fusible, excepting only tin and bismuth. The plumbers cast thin sheets of lead upon a table or mould, covered with a woollen, and above this with a linen-cloth, without burning or scorching the cloths. The melted lead is received in a wooden case without a bottom; which being drawn down the sloping table by a man on each side, leaves a sheet of its own width, and more or less thin according to the greater or less celerity of its descent. For thick plates, the table is covered over with moistened sand, and the liquid metal conducted evenly over it, by a wooden strike, which bears on a ledge at each side.

Some have preferred, for mechanic uses, the melted lead, or flatted sheets, to the cast; as being more equal, smooth, and solid. But whatever advantage of this kind

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394
Blue produced from other alkalies.

395
Nitre alkaliized by iron.

396
Iron filings and sulphur take fire spontaneously.

397
Has very little tenacity.

398
Sheet-lead.

399
Advantages of melted lead precarious.

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kind the milled sort may appear to have at first, they are not found to be very durable. When the lead is stretched between the rollers, its cavities must necessarily be enlarged. The particles of metal that may be squeezed into them can have no union or adhesion with the contiguous particles; and, of consequence, must be liable, from bending, blows, jars, &c. to start out again, and leave the mass spongy and porous.

400
Rendered
Sonorous.

Lead yields the dullest and weakest sound of all metallic bodies. Reaumur observes, that it is rendered sonorous by casting a small quantity into a spherical or elliptical segment, as in the bottom of an iron-ladle: from hence he conjectures, that the sound of the sonorous metals might be improved for the bells of clocks, &c. by giving them a similar form.

Though this metal very soon loses its lustre, and tarnishes in the air, it resists much longer than iron or copper the combined action of air and water, before it is decomposed or destroyed; and hence it is exceedingly useful for many purposes to which these metals can by no means be applied. When just become fluid, lead looks bright like quicksilver; but immediately contracts a variously coloured pellicle on the surface. If this is taken off, and the fire continued, a fresh pellicle will always be formed, till the metal is by degrees changed into a dusky powder, or calx. The injection of a little fat, charcoal-powder, or other inflammable matter, prevents this change, and readily revives the calx into lead again. It is said, that lead, recovered from its cakes, proves somewhat harder and whiter than at first, as well as less subject to tarnish in the air.

402
Minium.

The blackish calx or ashes of lead become of a very different appearance if the calcination is continued with a fire so moderate as not to melt them, and particularly if exposed to flame. By this treatment, they become first yellow; and are then called *massicot*, or *yellow lead*. This colour becomes gradually more and more intense, till at last the calx is of a deep red; and then is called *minium*, or *red lead*.

The preparation of this substance, which is much used in painting, has become a trade by itself. It is made from lead calcined to a greyish powder by keeping it melted over the fire. This powder, ground in mills, is further calcined in a reverberatory furnace, under a low arch, and frequently stirred with an iron-rake, to prevent its running and melting into clots, and to expose a fresh surface to the air and flame. The calcination lasts two or three days. The increase of the weight by some is said to amount to $\frac{1}{3}$, by others, to no less than $\frac{1}{2}$ of the lead employed; and the lead recovered from the minium to be $\frac{1}{5}$ less than the original weight of the metal. If the minium be further calcined, the increase is no more, but the quantity of lead recoverable from the calx proves less in proportion to the vehemence and continuance of the calcination.

403
Litharge.

If, instead of keeping this calx in a continued moderate heat, it is suddenly fused, the matter then puts on a foliated appearance, and changes to a dull kind of brick-colour when powdered, and is then called *litharge*. Most of this substance is produced by refining silver with lead, (see REFINING); and is of two kinds, white, and red. These two are distinguished by the

names of *litharge of gold*, and *litharge of silver*. The most perfect is that called *litharge of gold*: the pale sort contains a considerable proportion of lead in its metallic state; and even the highest coloured litharge is seldom free from a little metallic lead, discoverable and separable by melting the mass in a crucible; when the lead subsides to the bottom.

Lead mingles in fusion with all the metals except iron, with which it refuses any degree of union as long as the lead preserves its metallic form. On continuing the fire, the lead, scorifying or calcining, absorbs the phlogistic principle of the iron, and consequently promotes the calcination of that metal; both being at length reduced to calces. The fusible calx of lead easily unites with the calx of iron, and both melt together into an opaque brown or blackish glass. Copper does not unite with melted lead, till the fire is raised so high as to make the lead smoke and boil, and of a bright red heat. Pieces of copper, now thrown in, soon dissolve and disappear in the lead: the mixture, when cold, is brittle, and of a granulated texture. The union of these two metals is remarkably slight. If a mixture of copper and lead is exposed to a fire no greater than that in which lead melts, the lead almost entirely runs off by itself; a separation, of which no other example is known. What little lead is retained in the pores of the copper, may be scorified, and melted out, by a fire considerably less than is sufficient to fuse copper. If any of the copper is carried off by the lead, it swims unmelted on the surface.

Gold and silver are both dissolved by lead in a slight red heat. They are both rendered extremely brittle by the minutest quantity of this metal; though lead is rendered more ductile by a small quantity of either of them. In cupellation, a portion of lead is retained by gold, but silver parts with it all. On the other hand, in its eliquation from copper, if the copper contains any of the precious metals, the silver will totally melt out with the lead, but the gold will not. The attraction of lead to copper, however slight, is greater than that of copper to iron: a mixture of copper and iron being boiled in melted lead, the copper is imbibed by the lead, and the iron thrown up to the top. Silver is in like manner imbibed from iron by lead; whilst tin, on the contrary, is imbibed from lead by iron. If two mixtures, one of lead and tin, and another of iron and silver, be melted together, the result will be two new combinations, one of the tin with the iron at the top, the other with the lead and silver at the bottom: how carefully soever the matter be stirred and mixed in fusion, the two compounds, when grown cold, are found distinct, so as to be parted with a blow.

This metal is soluble in alkaline lixivia and expressed oils. Plates of lead boiled in alkaline lixivia, have a small part dissolved, and a considerable quantity corroded; the solution stains hair black. Lead, fused with fixed alkaline salts, is in part corroded into a dark-coloured scoria, which partially dissolves in water. Expressed oils dissolve the calces of lead, by boiling, in such large quantities as to become thick and consistent: hence plasters, cements for water-works, paint for preserving nets, &c. Acids have a greater affinity

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Phenomena
with other
metals.

405
Soluble in
alkalies and
in oils.

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affinity with lead than oils have. If the common plaster, composed of oil and litharge, be boiled in distilled vinegar, the litharge will be dissolved, and the oil thrown up to the top. The oil thus recovered, proves soluble like essential oils in spirit of wine; a phenomenon first taken notice of by Mr Geoffroy.

6. TIN.

The colour of this metal resembles silver, but somewhat darker. It is softer, less elastic, and sonorous, than any other metal except lead. When bent backwards and forwards, it occasions a crackling sound, as if torn asunder. It is the lightest of all the malleable metals, being little more than seven times specifically heavier than water. The tenacity of its parts also is not very considerable; a tin wire of $\frac{1}{16}$ of an inch diameter, being able to support only 495 pounds.

406
Capable of
being beat
into thin
leaves.

Tin is commonly reckoned the least ductile of all metals except lead; and certainly is so, in regard to ductility into wire, but not in regard to extensibility into leaves. These two properties seem not to be so much connected with one another as is generally imagined. Iron and steel may be drawn into very fine wire, but cannot be beat into leaves. Tin, on the other hand, may be beat into very thin leaves, but cannot be drawn into wire; gold and silver possess both properties in a very eminent degree; whilst lead, notwithstanding its flexibility and softness, cannot be drawn into fine wire, or beat into thin leaves. It melts the most easily of all the metals; about the 430th degree of Fahrenheit's thermometer. Heated till almost ready to melt, it becomes so brittle that large blocks may be easily beat to pieces by a blow. The purer sort, from its facility of breaking into long shining pieces, is called *grain-tin*. Melted, and nimbly agitated at the instant of its beginning to congeal, it is reduced into small grains, or powder.

407
Calcin'd.

With the heat necessary for fusion, it may also be calcined; or at least so far deprived of its phlogiston as to appear in the form of a grey calx, which may be entirely reduced to tin by the addition of inflammable matter. The calcination of tin, like that of lead, begins by the melted metal losing its brightness, and contracting a pellicle on its surface. If the fire is raised to a cherry-red, the pellicle swells and bursts, discharging a small bright flame of an arsenical smell. By longer continuance in the fire, the metal is converted first into a greyish, and then into a perfectly white calx, called *putty*, which is used for polishing glasses, and other hard bodies.

The calx of tin is the most refractory of all others, that of platinum excepted. Even in the focus of a large burning mirror, it only softens a little, and forms crystalline filaments. With glasses of bismuth, and the simple and articulated glasses of lead, it forms opaque milky compounds. By this property it is fitted for making the basis of the imperfect glasses called *enamel*s; (see GLASS, and ENAMEL). The author of the Chemical Dictionary relates, that "having exposed very pure tin, singly, to a fire as strong as that of a glass-house furnace, during two hours, under a muffle, in an uncovered test; and having then examined it, the metal was found covered with an exceedingly white calx, which appeared to have formed a vegetation;

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under this matter was a reddish calx, and an hyacinthine glass; and lastly, at the bottom, was a piece of tin unaltered. The experiment was several times repeated with the same success."

Nitre deflagrates with tin, and hastens the calcination of this as well as of other imperfect metals. The vapours which rise from tin, by whatever method it is calcined, have generally an arsenical smell. Tin melted with arsenic falls in great part into a whitish calx: the part which remains uncalcined proves very brittle, appears of a white colour, and a sparkling plated texture, greatly resembling zinc. The arsenic is strongly retained by the tin, so as scarcely to be separable by any degree of fire; the tin always discovering, by its augmentation in weight, that it holds a portion of arsenic, though a very intense fire has been used. Hence, as the tin-ores abound in arsenic, the common tin is found also to participate of that mineral.

408
Affinity of
tin with
arsenic.

Henckel discovered a method of separating actual arsenic from tin; namely, by slowly dissolving the tin in eight times its quantity of an aqua regia made with sal ammoniac, and setting the solution to evaporate in a gentle warmth: the arsenic begins to concrete whilst the liquor continues hot, and more plentifully on its growing cold, into white crystals. Mr Margraaf, in the Berlin Memoirs for 1747, has given a more particular account of this process. He observes, that the white sediment which at first separates during the dissolution, is chiefly arsenical: that Malacca tin, which is accounted one of the purest sorts, yielded no less than $\frac{1}{2}$ its weight of arsenical crystals; that some sorts yielded more; but that tin extracted from a particular kind of ore which contained no arsenic, afforded none. That the crystals were truly arsenical, appeared from their being totally volatile; from their subliming (a little fixed alkaline salt being added to absorb the acid) into a colourless pellicid concrete; from the sublimate, laid on a heated copper-plate, exhaling in fumes of a garlic smell; from its staining the copper white; and from its forming with sulphur, a compound similar to the yellow or sulphurated arsenic. He found that the arsenic was separable also by means of mercury: an amalgam of tin being long triturated with water, and the powder which was washed off committed to distillation, a little mercury came over, and bright arsenical flowers arose in the neck of the retort. Dr Lewis observes, that the crackling noise of tin in bending may possibly arise from its arsenic; as those operations which are said to separate arsenic from the metal, likewise deprives it of this property.

410
Dr Lewis's
observation.

Tin may be alloyed, in all proportions, with all metals by fusion: but it absolutely destroys their ductility, and renders them brittle, as in bell-metal; whence this metal has obtained the name of *diabolus metallorum*. It is remarkable, that the most ductile metals are most injured by the addition of a small quantity of tin; the vapour of a single grain of tin being sufficient to destroy the ductility of a considerable quantity of gold.

411
Injurious to
other metals.

Iron is dissolved by tin in a heat far less than that in which iron itself melts: the compound is white and brittle. Iron added to a mixture of lead and tin, takes up the tin, leaving the lead at the bottom; and, in like manner,

11 F

manner,

PRACTICE manner, if lead, tin, and silver are melted together, the addition of iron will absorb all the tin, and the tin only. Hence an easy method of purifying silver from tin.

412 Not liable to rust. Tin, notwithstanding it is, like lead, soon deprived of its lustre by exposure to the air, is nevertheless much less liable to rust than either iron, copper, or lead; and hence is advantageously used for covering over the infides of other metalline vessels. The amalgam of mercury and tin is employed to cover one of the surfaces of looking-glasses; by which they are rendered capable of reflecting the rays of light. The amalgam also, mixed with sulphur and sal ammoniac, and set to sublime, yields a sparkling gold-coloured substance called *aurum mosaicum*; which is sometimes used as a pigment. This preparation is commonly made from quicksilver and tin, of each two parts, amalgamated together, and then thoroughly mixed with sulphur and sal ammoniac, of each one part and a half. The mercury and sulphur unite into a cinabar, which sublimes along with the sal ammoniac; and, after sublimation, the aurum mosaicum remains at the bottom.

Sulphur may be united with tin by fusion; and forms with it a brittle mass, more difficultly fusible than pure tin. Sulphur has, in this respect, the same effect upon tin, as upon lead. The alloy of tin lessens the fusibility of these very fusible metals; while it increases the fusibility of other difficultly fusible metals, as iron and copper.

7. MERCURY, or QUICKSILVER.

Mercury is a fluid metallic substance, of a bright silver colour, resembling lead or tin when melted; entirely void of taste and smell; extremely divisible; and congeals into a degree of cold very difficultly produced, in this country, by art, (see **COLD**, and **CONGELATION**). It is the most ponderous of all fluids, and of all known bodies, gold and platinum excepted; its specific gravity being to that of water nearly as 14 to 1. It is found to be specifically heavier in winter than in summer, by 25 grains in 11 ounces.

Neither air nor water, nor the united action of these two, seem to make any impression upon mercury: nor is it more susceptible of rust than the perfect metals. Its surface, nevertheless, is more quickly tarnished than gold or silver; because the dust which floats in the air, quickly seizes on its surface. The watery vapours also, which float in the air, seem to be attracted by mercury.

415 Purification. From these extraneous matters, which only slightly adhere to it, mercury may be easily cleaned by passing it through a clean new cloth, and afterwards heating it: but if mixed with any other metal, no separation can be effected without distillation. In this process, a small portion of some of the metals generally arises along with the mercury. Thus, quicksilver distilled from lead, bismuth, or tin, appears less bright than before; stains paper black; sometimes exhibits a skin upon the surface; and does not run freely, or into round globules. Mr Boyle relates, that he has observed the weight of mercury sensibly increased by distillation from lead, and this when even a very moderate fire was made use of. By amalgamation

PRACTICE with stellated regulus of antimony, and then being distilled after a few hours digestion, mercury is said to become, by a few repetitions of the process, more ponderous, and more active: the animated, or philosophic mercuries of some of the alchemists, are supposed to have been mercury thus prepared. By the same, or similar processes, seem to have been obtained the curious mercuries which Boyle declared he was possessed of, and made himself; which were "considerably heavier in specie than common quicksilver,—dissolved gold more readily,—grew hot with gold, so as to be offensive to the hand, and elevated gold in distillation." When quicksilver is to be distilled, it is proper to mingle it with a quantity of iron-filings; which have the property of making it much brighter than it can be otherwise obtained, probably by furnishing phlogiton.

By digestion in a strong heat for several months, mercury undergoes a considerable alteration, changing into a powder, at first ashr-coloured, afterwards yellow, at length of a bright-red colour, and an acrid taste; and is then called *mercurius precipitatus per se*. In this last state it proves similar to the red precipitate, prepared from a solution of mercury in nitrous acid; the nitrous acid in the air seeming to be revived into its proper form, by long contact with the metal, (see **AIR**, n° 44). This calx proves less volatile in the fire than the mercury in its fluid state. It supports, for some time, even a degree of red heat. In the focus of a burning-glass, it is said, if laid upon a tile, to vitrify on a piece of charcoal, and to revive into running mercury before it exhales. Evaporated by common fire, it leaves a small portion of a light brown powder; which, Boerhaave relates, bore a blast-heat; swelled into a spongy mass; formed with borax a vitreous friable substance; but vanished in cupellation. By long continued digestion in a gentle heat, mercury suffers little change. Boerhaave digested it in low degrees of heat, both in open and close vessels, for 15 years together, without obtaining any other reward for his labour than a small quantity of black powder; which, by trituration, was quickly revived into running mercury. Constant triture, or agitation, produce a change similar to this, in a short time. Both the black and red powders, by bare exposure to a fire sufficient to elevate them, return into fluid mercury. The red powder has been revived by simply grinding it in a glass-mortar.

In like manner, quicksilver remains unchanged by distillation. Boerhaave had the patience to distil 18 ounces of mercury upwards of 500 times over, without observing any other change than that its fluidity and specific gravity were a little increased, and that some grains of a fixed matter remained. The vapours of mercury, like those of all other volatile bodies, cause violent explosions if confined. Mr Hellot gives an account of his being present at an experiment of this kind: a person pretending to fix mercury, had inclosed it in an iron box closely welded. When the mercury was heated, it burst the box, and dissipated in invisible vapours.

Mercury dissolves or unites with all metallic bodies, except three, *viz.* iron, arsenic, and nickel: in some cases it will absorb metals, particularly gold and silver, from

416 Curious mercuries by Boyle.

417 Mercurius precipitatus per se.

418 Mercury unaltered by a gentle heat;

419 Or by distillation.

420 Explosion by the vapours of mercury.

421 Amalgamated with different substances.

PRACTICE from their solution[†] in acids or alkalies; but does not act upon any metal when combined with sulphur, nor on precipitates made by alkalies, nor on calces by fire. Whatever metal it is united with, it constantly preserves its own white colour. It unites with any proportion of those metallic substances with which it is capable of being combined; forming, with different quantities, amalgams of different degrees of consistence. From the fluid ones, greatest part of the quicksilver may be separated by colature. Bismuth is so far attenuated by mercury, as to pass through leather with it in considerable quantity. It also promotes the action of quicksilver upon lead to a great degree; so that mercury united with $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$ its weight of bismuth, dissolves masses of lead in a gentle warmth, without the agitation, triture, comminution, or melting heat necessary to unite pure mercury with lead. From these properties, this solution of bismuth in mercury becomes a proper solvent for pieces of lead lodged in the human body.

422
Separation of the amalgamated metal.

On triturating or digesting amalgams for a length of time, a blackish or dusky-coloured powder arises to the surface, and may be readily washed off by water. Some of the chemists have imagined, that the amalgamated metal was here reduced to its constituent parts: but pure mercury is by itself reducible to a powder of the same kind; and the metallic particles in this process, united with the mercury, are found to be no other than the metal in its entire substance. Some metals separate more difficultly than others; gold and silver the most so. Boerhaave relates, that if the powder which separates from an amalgam of lead be committed to distillation with vinegar in a tall vessel, the mercury will rise before the vinegar boils: that, by a like artifice, quicksilver may be made to distil in a less degree of heat than that of the human body; but Dr Lewis, though he made many trials, was never able to succeed.

423
Becomes fixed by amalgamation with gold.

By amalgamation with gold, mercury may become exceedingly fixed; so as not to be dissolvable by the greatest heat. Concerning this, Dr Brandt relates the following curious experiment: "Having amalgamated fine gold with a large proportion of quicksilver, and strained off the superfluous mercury, he digested the amalgam in a close stopp'd vessel for two months with such a degree of heat, that a part of the quicksilver sublimed into the neck of the glass. The matter being then ground with twice its weight of sulphur, and urged with a gradual fire in a crucible, a spongy calx remained; which being melted with borax, and afterwards kept in fusion by itself for half an hour, in a very violent fire, still retained so much of the quicksilver, as to become brittle under the hammer, and appear internally of a leaden colour. The metal being again amalgamated with fresh mercury, the amalgam again ground with sulphur, and exposed to an intense fire, a spongy calx remained as before. This calx being digested in two or three fresh parcels of aqua regia, a small portion of whitish matter remained at last undissolved. The paper which covered the cylindrical glass wherein the digestion was performed, contracted, from the vapours, a deep-green circular spot in the middle, with a smaller one at the side; whereas the aqua regia digested in the same manner

by itself, or with gold, or with mercury, gave no stain. The first solution, on the addition of oil of tartar *per deliquium*, grew red as blood; on standing, it deposited, first, a little yellow calx, like aurum fulminans; afterwards, a bright matter like fine gold; and at last, a paler precipitate, inclining to green; its own deep red colour and transparency remaining unchanged. Being now committed to distillation, a colourless liquor arose; and the residuum, perfectly exsiccated, yielded, on edulcoration, a yellow calx of gold; which the alkaline lixivium had been unable to precipitate. The second solution turned green on the admixture of the alkaline liquor, and let fall a white precipitate, which turned black and brown. The several precipitates were calcined with twice their weight of sulphur, and then melted with four times their quantity of flint, and twelve of pot-ash, in a fire vehemently excited by bellows. The scoria appeared of a golden colour, which on pulverization and edulcoration, vanished. At the bottom was a regulus, which looked bright like the purest gold; but was not perfectly malleable. Broke, it appeared internally white; and the white part amounted to at least one-third its bulk. Besides this lump of metal, there were several others, white like silver, and soft as lead."

424
Supposed to be convertible into water.

In Wilson's chemistry, we have a process for converting quicksilver into water, by dropping it by little and little into a tall iron vessel, heated almost to a white heat in the bottom. Over the mouth of this vessel were luted seven aludels; and on the top, a glass alembic head, with a beak, to which was fitted a receiver. The mercury was put in so slowly, that it required 16 hours for one pound. Every time that a little quantity of mercury was put in, it made a great noise, filling the aludel's head, and receiver, with white fumes. When the vessels were cooled, a little water was found in each of the receivers; and in the first and second, some grains of crude mercury. The whole quantity amounted to 13 ounces and 6 drachms; which was expected to prove a powerful solvent of gold and silver: but, on trial, was found to be in no respect different from common water. On this experiment, Dr Lewis has the following note.

"The possibility of converting mercury into water, or at least of obtaining a great quantity of water from mercury, has not only been believed by several great men in the chemical art; but some have even ventured to assert that they have actually made this change. Yet nevertheless, they have delivered the history of this affair with such marks, as seem to make the reality of the change extremely doubtful. Mr Boyle, (in his tract of the *production of Chemical Principles*, annexed to *Scept. Chemist.* p. 235), says, "that he once obtained water from mercury without addition, without being able to make the like experiment succeed afterwards." Mr Le Febvre, who is generally looked upon as an honest practitioner, directs a process similar to that above (Wilson's), for obtaining of this mercurial water. But it is to be suspected, as Mr Hales very well observes (in his *Statical Experiments*, p. 200.), that Mr Boyle, and others, were deceived by some unheeded circumstance, when they thought they obtained a water from mercury, which should seem rather to have arisen from the lute

425
Dr Lewis's detection of the fallacy of this process.

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and earthen vessels made use of in the distillation : for Mr Hales could not find the least sign of any moisture upon distilling mercury in a retort made of an iron gun-barrel, with an intense degree of heat ; although he frequently cohobated the mercury which came over into the recipient. In a course of chemical experiments, I repeated Mr Hales's process, and urged the mercury, which was let fall by little and little, through an aperture made in the gun-barrel, with a moist intense degree of heat, without obtaining any water ; but it being suspected by a bystander, that the mercury in this experiment came over before it had been sufficiently acted upon by the fire, by reason of the lowness of the neck of the distilling instrument, the experiment was varied in the following manner. Sixteen ounces of mercury were heated in a crucible, in order to evaporate any moisture that might have been accidentally mixed with it ; and an iron gun-barrel of four feet in length, being placed perpendicularly in a good furnace, and a glass-head and recipient fitted to its upper part, the mercury was let fall by little and little into the barrel, and the fire urged with bellows. After each injection, the mercury made a considerable noise and ebullition, and arose into the head ; where it soon condensed and trickled down, in the common form of running mercury, into the recipient, without the least perceptible appearance of any aqueous humidity."

426
How to amalgamate with regulus of antimony.

Mercury is difficultly amalgamated with regulus of antimony and copper ; for which some particular manœuvres are required. Two of Dr Lewis's receipts for uniting quicksilver with copper, we have already given, (see n^o 376) : with regulus of antimony, mercury, he says, may be perfectly united, by pouring a small stream of melted regulus into a considerable portion of mercury, made almost boiling hot. Another method directed by Henckel, is to put mercury into an iron mortar along with some water, and set the whole over the fire. When the water boils, a third or fourth part of melted regulus is to be poured in, and the mass ground with a pestle, till the amalgama is completed. The use of the water, as Dr Lewis observes, is to hinder the mercury from flying off by the heat of the regulus : but as the two are by this means not put together in so hot a state, the union is more difficult, and less perfect. The loss of the mercury, in the first process, may be prevented by using a large vessel, and covering it with a perforated iron-plate, through the hole in which the regulus is to be poured. This method is likewise applicable to the amalgamation of copper.

With sulphur, mercury unites very readily, forming by trituration, or simple fusion, a black powder, or mass, called *Ethiops mineral* ; which, by careful sublimation, becomes the beautiful red pigment called *vermilion*. (See SULPHUR, sect. iv.)

8. ZINC.

This is a semi-metal of a bluish white colour. It is the least brittle of any of the semi-metals ; and when amply supplied with phlogiston, which may be done by treating it in close vessels with inflammable matters, it possesses a semi-ductility, by which it may be flattened into thin plates. When broken, it appears

of many flat shining plates or facets, which are larger when slowly than when hastily cooled. When heated, it is very brittle ; and crackles like tin, only louder, when bent. Exposed to the air, it contracts in length of time a yellowish ruit. Its specific gravity, according to Dr Lewis, is to that of water as $7\frac{1}{10}$ to 1. It begins to melt as soon as red hot ; but does not flow thin till the fire is raised to a white heat. Then the zinc immediately begins to burn with an exceedingly bright and beautiful flame. Kept just in in fusion, it calcines slowly ; not only on the upper surface, but likewise round the sides, and at the bottom of the crucible. If several pieces are just melted together, the mass, when grown cold, may be broke into the same number ; their union being prevented by a yellowish calx, with which each piece is covered over. Mr Malouin relates, in the French Memoirs for 1742, that a quantity of zinc being melted six times, and the fusion continued fifteen hours each time, it proved, on every repetition, harder, more brittle, less fusible, and less calcinable : that after the two first fusions, its colour was grey ; after the third, brown ; and after the fourth, black : that the fifth rendered it of a slate-blue ; and the sixth of a clear violet.

So violent is the deflagration of zinc, that the whole of its calx is sublimed by it, in the form of light flocks, or wool ; which, however, are easily reduced to a fine powder. These are used in medicine, and reckoned an excellent remedy in epileptic cases. When once sublimed, they are by no means capable of being elevated again by the most violent heat. In a heat far greater than that in which they first arose, they suffer no alteration ; in a very vehement one they melt, according to Henckel, into a semi-opaque green glass. Vitrified with borax, they give a grey, or brownish, glass. From the brightness of the flame of burning zinc, and the garlick-smell which it is said to emit, some have concluded that zinc contained the phosphoric acid ; which, from some other circumstances, is not altogether improbable.

The flowers of zinc have been thought very difficultly, or not at all, reducible to their metallic form by an addition of phlogiston. But Dr Lewis observes, that this difficulty proceeds not from their unfitness to be restored into the form of zinc, but from the volatility of the semi-metal, which occasions its being dissipated in fumes, if the common methods are made use of. All cakes, those of iron excepted, require a greater heat for their fusion than that in which the metal itself melts ; and as a full melting heat is the greatest that zinc can sustain, it burns and calcines the instant of its revival, if the air is admitted ; and in close vessels escapes, in part at least, through their pores. On mixing flowers of zinc with powdered charcoal, and urging them with a strong fire in a crucible, a deflagration and fresh sublimation ensue ; sufficient marks that the zinc has been reduced to its metallic form ; for as long as it remains in the state of calx, neither of these effects can happen. If the vessel is so contrived as to exclude the air, and at the same to allow the reviving semi-metal to run off from the vehemence of the heat, into a receiver kept cool, the zinc will there concrete, and be preserved in its metallic state.

427
Deflagration.

428
Flowers of zinc.

429
Dr Lewis's method of reducing them.

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It is still more effectually detained by certain metallic bodies, as copper, or iron; with which the zinc, when thus applied, unites more readily and perfectly than it can be made to do by any other means.

430
Oil from
flowers of
zinc by Mr
Homberg.

Homberg pretended to obtain an oil from the flowers of zinc, by dissolving them in distilled vinegar, and then distilling the solution in a glass retort. At first a quantity of phlegm arose; then the superfluous acid; and at last an empyreumatic oil. This last, which Homberg imagined to proceed from the flowers of zinc, Neuman very justly attributes to the distilled vinegar.

431
Another by
Mr Heliot.

An oil of another kind was obtained by Mr Heliot from the above solution, by digesting the ash-coloured residuum, which remained after the distillation with the acidulous phlegm which came over, for eight or ten days; distilling the tincture to dryness; and repeating the extraction with the distilled liquor, till the quantity of dry extract, thus obtained, was very considerable. This resin-like matter, distilled in a retort with a stronger fire, yielded a yellowish liquor, and a white sublimate. The liquor discovered no mark of oil; but, upon being passed upon the sublimate, immediately dissolved it, and then exhibited on the surface several drops of a reddish oil. Some of this oil was taken up on the point of a pencil, and applied to gold and silver-leaf. In twenty-four hours, the parts touched appeared, in both, equally dissolved.

432
Zinc with
other me-
tals.

Zinc does not unite in fusion with bismuth, or the semi-metal called *nickel*. It unites difficultly with iron; less so with copper; easily with the other metals. It renders iron or copper more easily fusible; and, like itself, brittle whilst hot, though considerably malleable when cold. It brightens the colour of iron almost into a silver lue, and changes that of copper into a yellow or gold colour. It greatly debases the colour of gold; and renders near an hundred parts of that most ductile metal brittle and intractable. A mixture of equal parts of each is very hard, white, and bears a fine polish; hence it is proposed by Mr Heliot for making specula. It is not subject to rust or tarnish in the air, like those metals whose basis is copper. It improves the colour and lustre of lead and tin, renders them firmer, and consequently fitter for several mechanic uses. Tin, with a small proportion of zinc, forms a kind of pewter. Lead will bear an equal weight, without losing too much of its malleability. Malouin observes, that arsenic, which whitens all other metals, renders zinc black and friable; that when the mixture is performed in close vessels, an agreeable aromatic odour is perceived on opening them; that zinc amalgamated with mercury, and afterwards recovered, proves whiter, harder, and more brittle than before, and no longer crackles on being bent.

441
Deflagra-
tion of zinc
with other
metals.

Mixtures of zinc with other metals, exposed to a strong fire, boil and deflagrate more violently than zinc by itself. Some globules of the mixture are usually thrown off during the ebullition, and some part of the metal calcined and volatilized by the burning zinc: hence this substance has been called *metallic nitre*. Gold itself does not entirely resist its action. It very difficultly volatilizes copper; and hence the sublimates obtained in the furnaces where brass is made, or mixtures of copper and zinc melted, are rarely found to

participate of that metal. On melting copper and zinc separately, and then pouring them together, a violent detonation immediately ensued, and above half the mixture was thrown about in globules.

Zinc does not unite in the least with sulphur, or with crude antimony, which scorify all other substances except gold and platina; nor with compositions of sulphur and fixed alkaline salts, which dissolve gold itself. With nitre it deflagrates violently. Its flowers do not sensibly deflagrate; yet alkalize double their weight of the salt, more readily than the zinc itself. The alkaline mass appears externally greenish, internally of a purple colour. It communicates a fine purple to watery, and a red to vinegar. The acceus tincture inspissated, leaves a tenacious substance which soon runs in the air into a dark red caustic liquor, the alkalic of some of the pretended deaups.

445
Cannot be
united with
sulphur.

446
Nitre alka-
lized by
flowers of
zinc.

9. BISMUTH.

This semi-metal, called also *tin-glass*, and by some naturalists *marcasita officinarum*, is somewhat similar to the regulus of antimony. It appears to be composed of cubes formed by the application of plates upon each other. Its colour is less white than that of regulus of antimony; and has a reddish tinge, particularly when it is exposed to the air. In specific gravity it approaches to silver; being nearly ten times heavier than water. It has no degree of malleability; breaking under the hammer, and being reducible by trituration to fine powder. Its melts a little later than tin, and seems to flow the thinnest of all metallic substances. Bismuth is semi-volatile, like all other semi-metals. When exposed to the fire, flowers rise from it; it is calcined; and converted into a litharge and glass nearly as lead is: (See GLASS.) It may even be employed like that metal, in the purification of gold and silver by cupellation. (See REFINING.) When in fusion it occupies less volume than in its solid state: a property peculiar to iron among the metals, and bismuth among the semi-metals. It emits fumes in the fire as long as it preserves its metallic form; when calcined or vitrified, it proves perfectly fixed.

447
Convertible
into
litharge
and glass.

Bismuth mingles in fusion with all the metalline substances, except regulus of cobalt and zinc. The addition of nickel, or regulus of antimony, renders it miscible with the former, though not with the latter. It greatly promotes the tenacity as well as facility of the fusion of all those metals with which it unites. It whitens copper and gold, and improves the colour of some of the white metals: mixed in considerable quantity, it renders them all brittle, and of a flaky structure like its own. If mixed with gold, or silver, a heat that is but just sufficient to melt the mixture, will presently vitrify a part of the bismuth; which, having then no action on those perfect metals, separates, and glazes the crucible all round.

448
Promotes
the fusion
of all the
metals.

10. REGULUS OF ANTIMONY.

This semi-metal, when pure, and well fused, is of a white shining colour, and consists of laminae applied to each other. When it has been well melted, and not too hastily cooled, and its surface is not touched by any hard body during the cooling, it exhibits the perfect

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Appear-
ance of a
flor on its
surface.

PRACTICE perfect figure of a star, consisting of many radii issuing from a center. This proceeds from the disposition that the parts of this semi-metal have to arrange themselves in a regular manner, and is similar to the crystallization of salts.

Regulus of antimony is moderately hard; but, like other semi-metals, it has no ductility, and breaks in small pieces under a hammer. It loses $\frac{1}{2}$ of its weight in water. The action of air and water destroys its lustre, but does not rust it so effectually as iron or copper. It is fusible with a heat sufficient to make it red hot; but when heated to a certain degree, it fumes continually, and is dissipated in vapours. These fumes form what are called the *argentine flowers* of regulus of antimony, and are nothing but the earth of this semi-metal deprived of part of its inflammable principle, and capable of being reduced to its reguline state by an union with this principle.

450
Sublimable.

451
Separation of the sulphur from antimony.

There are different methods of preparing the regulus of antimony; but all of them consist merely in separating the sulphur which this mineral contains, and which is united with the regulus. It is plain, therefore, that regulus of antimony may be made by an addition of any substance, to crude antimony in fusion, which has a greater attraction for sulphur than the regulus itself has. For this purpose, alkaline salts have been employed, either previously prepared, or extemporaneously produced in the process, by a defflagration of tartar and nitre. By this means, the sulphur was indeed absorbed; but the hepar sulphuris, formed by the union of the sulphur and alkali, immediately dissolved the regulus, so that very little, sometimes none at all, was to be obtained distinct from the scoria. Metals are found to answer better than alkaline salts, but the regulus is seldom or never free from a mixture of the metal employed. The way of obtaining a very pure regulus, and in great quantity, is to calcine the antimony in order to dissipate its sulphur; then to mix the calx with inflammable matters, such as oil, soft soap, &c. which are capable of restoring the principle of inflammability to it. This method was invented by Kunkel. Another, but more expensive way of procuring a large yield of very pure regulus, is, by digesting antimony in aqua regis, which dissolves the reguline part, leaving the sulphur untouched, precipitating the solution, and afterwards reviving the precipitate by melting it with inflammable matters.

452
Regulus easily miscible with mercury.

There are considerable differences observed in the regulus of antimony, according to the different substances made use of to absorb the sulphur. When prepared by the common methods, it is found to be very difficultly amalgamated with mercury, (see n° 426); but Mr Pott has discovered, that a regulus prepared with two, or five parts of iron, four of antimony, and one of chalk, yield reguli which readily unite with mercury into an hard amalgam, by bare trituration with water. Marble and quicklime succeed equally well with chalk; but clay, gypsum, or other earths, have no effect.

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Extemporaneously miscible with cawk.

One earthy substance, found in lead-mines, and commonly called *cawk*, has a very remarkable effect upon antimony. This is found in whitish, moderately compact, and ponderous masses: it is commonly supposed

a spar; but differs from bodies of this kind, in not being acted upon by acids. If a lump of cawk, of an ounce or two, be thrown red hot into 16 ounces of melted antimony, the fusion continued about two minutes, and the fluid matter poured off, "you will have 15 ounces like polished steel, and as the most refined quicksilver." *Phil. Transf.* n° 110. Dr Lewis mentions his having repeated this experiment several times with success: but having once varied it by mixing the cawk and antimony together at the first, a part of the antimony was converted into a very dark black vitreous matter, and part seemed to have suffered little change; on the surface of the mass some yellow flowers appeared. Neither the nature of cawk, nor of the change produced on antimony by it, has been hitherto well considered.

Regulus of antimony enters into the compositions for metallic speculums for telescopes, and for printing-types. It is also the basis of many medicinal preparations; but many of these, which were formerly much esteemed, are found to be either inert, uncertain, or dangerous in their operation. When taken in substance, it is emetic and purgative, but uncertain in its operation; because it only acts in proportion to the quantity of solvent matter it meets with in the stomach; and if it meets with nothing capable of acting upon it there, the regulus will be quite inactive. For these reasons, the only two preparations of antimony now retained, at least by skilful practitioners, are the infusion of glass of antimony in wine, and emetic tartar. For making the glass of antimony we have the following process. "Take a pound of antimony; reduce it to fine powder, and let it over a gentle fire; calcine it in an unglazed earthen pan, till it comes to be of an ash colour, and ceases to fume: you must keep it continually stirring; and if it should run into lumps, you must powder them again, and then proceed to finish the calcination. When that is done, put the calcined antimony into a crucible; set it upon a tile in a wind-furnace; put a thin tile on the top; and cover it all over with coals. When it is brought into fusion, keep it so in a strong fire for an hour: then put into it an iron rod; and when the melted antimony, which adheres to it, is transparent, pour it upon a smooth, hot, marble; and when it is cold, put it up for use. This is *vitrum antimonii*, or *sibiium*."

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Glass of antimony.

This preparation is more violent in its effects than the pure regulus itself; because it contains less phlogiston, consequently is similar to a regulus partially calcined, and so more soluble. Hence it is the most proper for infusion in wine, or for making the tartar emetic. It is obviously, however, liable to great uncertainties in point of strength; for as the antimony is more or less strongly calcined, the glass will turn out stronger or weaker in its operation, and consequently all the preparations of it must be liable to much uncertainty. This uncertainty is very apparent in the strength of different parcels of emetic tartar: accordingly Mr Geoffroy found by examination of different emetic tartars, that an ounce of the weakest contained from 30 to 90 grains of regulus; an ounce of moderate strength contained about 108 grains; and an ounce of the strongest kind contained 154 grains. For these reasons, the author of the Chemical

455
Difference of strength in emetic tartars.

miscal

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Pulvis algaroth the most proper material for emetic tartar.

mical Dictionary recommends the pulvis algaroth, (n° 258.) as the most proper material for making emetic tartar; being perfectly soluble, and always of an equal degree of strength. Emetic tartar, as he justly observes, ought to be a metallic salt composed of cream of tartar saturated with the regulus of antimony; and Mr Beaumé has shewn such a saturation to be possible, and that the neutral salt crystallizes in the form of pyramids. They are transparent while moist; but by exposure to a dry air, they lose the water of their crystallization, and become opaque. The preparation of this salt, according to Mr Beaumé, consists in mixing together equal parts of cream of tartar, and levigated glass of antimony: these are to be thrown gradually into boiling water; and the boiling continued, till there is no longer any effervescence, and the acid is entirely saturated. The liquor is to be filtered; and upon the filter is observed a certain quantity of sulphureous matter, along with some undissolved parts of the glass of antimony. When the filtered liquor is cooled, fine crystals will be formed in it, which are a soluble tartar perfectly saturated with glass of antimony. He observes, that the dissolution is soon over if the glass is well levigated, but requires a long time if it is only grossly powdered.

457
Objection to its use.

The trouble of levigating glass of antimony, as well as the uncertainty of dissolving it, would render *pulvis algaroth* much preferable, were it not on account of its price; which would be a temptation to those in use to prepare medicines, to substitute a cheaper antimonial preparation in its place.

As regulus of antimony, like other metallic substances, is soluble in liver of sulphur, it happens, that, on boiling antimony in an alkaline ley, the salt, uniting with the sulphur contained in that mineral, forms an hepar sulphuris, which dissolves some of the reguline part. If the liquor is filtered, and saturated with an acid, the regulus and sulphur will fall together in form of a yellowish or reddish powder, called *golden sulphur of antimony*. If the ley is suffered to cool, a like precipitation of a red powder happens. This salt is called *kermes mineral*.

458
Diaphoretic antimony.

Nitre deflagrates violently with antimony, consuming not only its sulphureous part, but also the phlogiston of the regulus; and thus reduces the whole to an inert calx, called *antimonium diaphoreticum*. If equal parts of nitre and antimony are deflagrated together, the sulphureous part is consumed, as well as part of the inflammable principle of the regulus. The metalline part melts, and forms a semi-vitreous mass, of a reddish colour, called *crocus metallorum*, or *liver of antimony*. It is a violent emetic, and was formerly used for making infusions in wine similar to those of glass of antimony; but is now disused on account of its uncertainty in strength. It is still used by the farriers; but the substance sold for it is prepared with a far less proportion of nitre; and sometimes even without any alkaline salt being added to absorb part of the antimonial sulphur. This *crocus* is of a dull red colour; and when powdered, assumes a dark purple.

II. ARSENIC.

This mineral, when in its pure state, has no appearance of a metallic substance. It is moderately heavy,

compact, brittle, and of a crystalline and vitreous appearance. Exposed to the air, it changes to a milky hue like that of porcelain; and at length to the opaque whiteness of white enamel. The larger masses preserve their transparency longer than the small, and longer in a dry than in a moist air. In the fire it totally exhales before melting, with a strong smell of garlic. The fumes, caught in proper vessels, condense either into a white powder, or into crystalline masses, as the receiver is more or less removed from the fire.

Arsenic easily unites with all metals and semi-metals, all of which it renders brittle. It renders gold of a greyish colour in its broken surface; silver, of a deep grey; and copper, white. Tin becomes, by mixture with arsenic, much harder, and more unfusible; lead becomes hard and very brittle; and iron is changed into a blackish mass. It volatilizes, vitrifies, and scorifies, all solid bodies; gold, silver, and platinum, excepted.

We have already taken notice (n° 183.) that arsenic is capable of decomposing nitre, and uniting with its basis. It then forms a singular sort of salt which cannot be decomposed by any acid; because the arsenic, when deprived of phlogiston, (which it perfectly is by the decomposition of the nitre,) seems to have a greater attraction for alkalis than acids have. Was it possible therefore to deprive arsenic of all its phlogiston, we should no doubt find it capable of expelling the marine, or vitriolic, as well as the nitrous acid. It readily unites with alkaline salts, in the common way of fusion: but is then easily separable by an acid; because, not being deprived of its phlogiston, the union between it and the alkali is very weak. This neutral arsenical salt may itself be decomposed, by melting it with inflammable matters, or adding a solution of it to any metallic solution. A double decomposition and combination then take place; the acid unites with the alkali, and the arsenic with the metal. Concerning the uses of this neutral salt, we find the following paragraph in the Chemical Dictionary.

“The uses of the neutral arsenical salt are not yet well determined; yet, as the arsenic seems to be strictly combined with the fixed alkali, this salt may probably be usefully employed, 1. For the preparation of regulus of arsenic. 2. To combine arsenic conveniently with metallic matters. 3. In the composition of many glasses. 4. As the corrosive mineral acids, when saturated with fixed alkali, form very mild salts, we may be induced to believe that arsenic completely saturated with a fixed alkali, as it is in the neutral arsenical salt, might form a very mild salt, which may be powerful in medicine; but the name of arsenic is so terrible, that it will probably never be tried: but if it should, very numerous and long trials ought previously to be made on animals.

“This salt might probably be useful in arts; for Mr Beaumé prepares large quantities of it for different manufactures; but the uses to which it is applied are kept a secret.”

In his prediction, however, our author has been mistaken; for a treatise has appeared, recommending, not the neutral arsenical salt, or any milder preparation of this substance, but pure white arsenic itself, as a specific in cancers. This treatise is published

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Neutral salt of arsenic.

461
May be decomposed by phlogiston.

462
Used in some manufactures.

463
Arsenic recommended as a specific in cancers.

by

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by M. le Febvre, a French physician, who directs the arsenic to be taken in the following manner: "Take four grains * of arsenic, of a clear, white, shining appearance, and in small crystals; dissolve it by boiling in a pint † of distilled water; let the patient take a table spoonful of this solution, with an equal quantity of milk, and half an ounce of syrup of poppies, every morning fasting, and taking care to taste nothing for an hour after. This course must be continued for eight days, after which a dose is to be taken in the same manner twice every day; the first in the morning, the second towards eight at night. At the end of a fortnight three doses are to be given in a day, the third being taken at mid-day.

"In this manner women of a weakly constitution may continue till the cure is completed. But, with an adult of a good constitution, the dose may be augmented, by degrees, every eight days, till he take six spoonfuls of the solution every day; two table-spoonfuls being taken for each dose, with as much milk, and half an ounce of syrup of poppies. For children, tea-spoons must be used; and the dose should, on no account, exceed three of these, with a proportional quantity of syrup of poppies.

"But besides that the solution of arsenic is thus to be increased to a certain height, in point of quantity, the strength is also to be augmented. Six grains of arsenic may be dissolved in the second bottle of the solution, and eight in the third. But beyond this, our author thinks it unadvisable to proceed. He has, in general, found six bottles of the solution sufficient for the cure of an open cancer. In one case, however, eight were necessary.

"He informs us, that this remedy, taken with the above precautions, never occasions any unlucky accident; and is not disagreeable to the taste. It does not act in any certain manner upon the secretions or excretions. Some, indeed, discharge their urine more freely than usual; with some the belly is more loose; and with others the perspiration is more copious; but these effects are neither general nor constant.

"A purgative compounded of manna, rhubarb, and sal seignette, is to be given every eight or twelve days. Whey, with twelve grains of nitre to the bottle, or a weak decoction of the root of althea, with an equal quantity of nitre, is to be used for common drink. With respect to regimen, it is necessary to abstain from wine and fermented liquors. Broth made with a little veal, beef, or chicken, &c. are proper.

"M. le Febvre has sometimes been obliged to give the Peruvian bark, and to open an issue, when the humours were either very alkaline, or in very great quantity. He even considers an issue as useful in every case.

"Besides this treatment by internal medicines, he recommends, that the tumour, if not ulcerated, should be washed with a solution of arsenic, in the proportion of eight grains to a pint; and he advises the following cataplasm. Take of carrot-juice, one pound; of sugar of lead, half an ounce; of arsenic, dissolved in distilled vinegar, half an ounce; of liquid laudanum,

a drachm and an half: form the whole into a mass, with as much powder of hemlock as is necessary. With part of this cataplasm the tumour is to be covered to a tolerable thickness, and the whole kept on with a diachylon plaster.

"If the cancer is of the ulcerated kind, he advises that the ichorous serosity be taken away at each dressing, by means of dry *chapee*. He then directs the ulcer to be fomented with the arsenical solution, having the chillee taken off it, and having about a third part of red wine added to it. If the sore is of a very bad kind, he proposes that the arsenic be dissolved in a decoction of bark, for fomenting the ulcer. After this, the cataplasm mentioned above, and the plaster, are to be applied. This treatment must be renewed every twelve hours.

"Mr le Febvre, before he concludes this treatise, assures his readers, that, in more than two hundred instances, he has had proofs of the efficacy of the medicine here proposed. He does not, however, pretend that it is infallible in every case. He considers the disease to be incurable, if, in its progress, a considerable hemorrhage has happened, from the erosion of large blood-vessels; also when it attacks hæmorrhoidal or phthical patients. To judge of the efficacy of any remedy, he observes, that the patient with whom it is tried should at least enjoy an ordinary good constitution, and be free from a complication of diseases. And he considers the exhibition of a new remedy to a patient, in some measure, breathing his last, as serving no other purpose but to bring it into discredit." *Edin. Med. Comment.* vol. IV. p. 56,—61.

Whatever good effects arsenic may produce when given in this way, certain it is, that this substance is, of all others, the most poisonous, and most certainly fatal, if taken into the human body, even in a small quantity. It seems to act not only upon the stomach and intestines, but to produce also a very great tendency to dissolution in the blood itself; for those who die poisoned with arsenic, are generally covered over with red or purple spots. When arsenic is swallowed, a nausea, sickness, and reaching, commonly ensue in about half an hour. These are followed by violent vomitings, hiccups, and pains in the stomach and bowels. Convulsions and palsies of the limbs presently succeed, with intense heats, cold sweats, palpitations of the heart, extreme anxiety, restlessness, prostration of strength, thirst, and dryness of the mouth and throat, loss of reason, and at last death. If the quantity taken was considerable, the patient dies in seven or eight hours after taking it; and the stomach and intestines are found, upon dissection, to be corroded or perforated.

Arsenic is a poison the most certainly fatal and most difficult to be cured of any, (if we except, perhaps, large doses of antimonial emetics,) on account of its being difficultly soluble in water, and incapable of decomposition. Corrosive sublimate mercury, solution of mercury in aqua fortis, &c. will as certainly poison as arsenic itself: but they are by no means so dangerous; because, being compounded of quicksilver united with an acid, any alkaline substance will infallibly decompose

* The French grain is here meant, which is less than the English, 72 French grains being only equal to 60 English.

† The French pint is here meant, contains 32 Troy ounces of water.

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Symptoms
in those
poisoned
by arse-
nic.

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Why more
difficult
to cure than
other poi-
sons.

compound and destroy the poison, so that scarcely any bad effects can happen but what arise from its first action on the stomach. Arsenic, on the contrary, cannot be decomposed, nor united with any known substance, without a considerable degree of heat. It therefore remains in the stomach, continually exerting its mischievous qualities, till it is all discharged by vomiting.

Many antidotes have been proposed against this pernicious mineral; but, that they might be rationally put confidence in, it should first be demonstrated, that they can make a change upon arsenic in substance, or in solution, in a heat no greater than that of the human body. Alkalies, which have been directed, cannot unite with arsenic when in the stomach. Acids, which have been ordered on a contrary supposition, will indeed dissolve arsenic; but the solution, in all probability, would prove a more violent poison than the arsenic itself. Oils, fats, warm fat broths, fresh butter, or milk, are recommended as the most proper means of obviating the poison, and promoting its discharge by vomit: and indeed in such deplorable cases they are the only remedies to which we can apply; though it is evident the efficacy even of these must be exceedingly uncertain; and for this plain reason, that the arsenic is already in contact with the stomach; and though they might prevent the action of the poison if they had been *first* swallowed, their operation must be exceedingly less efficacious after the poison has had access to the stomach, and begun to exert its virulent effects upon it.

The best method of giving arsenic the metalline form, or changing it into a *regulus*, as it is called, is by mixing it, when powdered, with oil-olive, so as to form a paste; the mixture is to be put into a retort, or glass matras, and to be distilled, or sublimed, with a fire at first very moderate, and sufficient to raise only the oil. After the oil has penetrated the arsenic, its more fluid parts exhale, and it remains in form of a charred coal. Then the fire is to be increased, and the metallized arsenic soon sublimes to the top. When no more sublimes, the vessel is to be broke, and the adhering crust of regulus of arsenic separated. The regulus must be sublimed a second, or even a third time, in order to give it as perfect a metallic form as it can receive. The oil, which arises during this operation, is more fetid than any empyreumatic oil, and almost intolerable.

Regulus of Cobalt and Nickel. See METALLURGY.

SECT. IV. Inflammable Substances.

THESE may be divided into the following classes: 1. Sulphurs. 2. Ardent spirits. 3. Oils and fats. 4. Resins. 5. Bitumens; and, 6. Charcoal.

1. SULPHURS.

1. *Common sulphur*. For the extraction of this substance from its ores, see SULPHUR. The artificial composition of it we have already related, n° 165; and have now only to take notice of a very few of its properties, which come more properly under this section.

Sulphur, as commonly used in commerce and the arts, is of a pale yellow colour, of a disagreeable and

peculiar smell, which is rendered more sensible when it is heated or rubbed. By rubbing, it receives very curious electrical qualities: (See ELECTRICITY.) Its specific gravity is considerably greater than that of water, though less than earths or stones. In close vessels, sulphur is incapable of receiving any alteration. It melts with a very gentle heat; and then is sublimed, adhering to the capital in small, very fine, needle-like crystals, called *flowers of sulphur*. It may thus be sublimed many times without alteration. If sulphur is exposed to a heat barely sufficient to melt it, and, very slowly cooled, it crystallizes in form of many needles crossing one another. Some of these pointed crystals may also be observed in the interior parts of the lumps of sulphur which have been melted, and cast into cylindrical moulds, as they are commonly sold; because the center of these cylindrical rolls is more slowly cooled than the surface. Sulphur also gives this needle-like form to cinnabar, antimony, and many other minerals containing it. Sulphur may be decomposed in several ways. The most simple is by burning; which we have already taken notice of, n° 118. It may also be very effectually decomposed by mixing it with iron filings and water. In this case the phlogiston is dissipated, and the acid uniting with the iron forms a green vitriol.

It is very remarkable, that though sulphur is composed of vitriolic acid and phlogiston, yet the addition of more inflammable matter, so far from making the union stronger, weakens it to a great degree: and hence we have another method of decomposing this substance; namely, by combining it with a large quantity of oil, and distilling the compound.

Sulphur is capable of being easily dissolved in expressed oils, but very difficultly in essential ones. These compositions are called *balsams of sulphur*; and are sometimes employed in medicine, but are found to be of a very heating nature. They are much used by farriers. According to Mr Beaumé, sulphur cannot be dissolved in oil, without a heat sufficient to melt it. A larger quantity is kept dissolved when the mixture is hot, than when cold; and consequently, the sulphur, especially if it has been dissolved in a thin essential oil, crystallizes on cooling the mixture. The sulphur, thus separated from the oil, is found not to be altered in any respect from what it formerly was; but if the mixture is exposed to a degree of heat capable of entirely decomposing the oil, the sulphur is decomposed along with it, and the same products are obtained by distilling this mixture to dryness, as if a mixture of pure oil of vitriol and oil were distilled. These products are, first a portion of oil, when an essential oil was made use of in the composition of the balsam; then some volatile sulphureous acid, which is at first watery, and afterwards becomes stronger; along with this acid more oil arises, which becomes more and more thick towards the end of the distillation; and lastly, when the retort has been made red hot, nothing remains but a fixed coal.

In this process we find, that both the sulphur and oil are decomposed. The acid of the sulphur seems to attack the watery principle of the oil, while its phlogiston remains confounded with that of the oil, or is dissipated in vapours.—Hence, though the vitriolic acid in sulphur

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Crystalliza-
ble.

471
Decomposed by a
superabundance of
phlogiston.

466
The most
approved
remedies
uncertain.

467
Regulus of
arsenic.

468
General di-
vision.

469
Sulphur.

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phur is concentrated to the utmost degree, and perfectly free from water, what rises in this distillation is very aqueous, by reason of the water which it attracts from the oil.

472
How soluble in spirit of wine.

Spirit of wine does not sensibly act upon sulphur in its liquid state; but if both the spirit of wine and sulphur meet in the state of vapour, they will then unite, and a perfect solution will take place. By methods of this kind, many combinations might be effected, which have been hitherto thought impossible.

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Its union with metals.

Pure sulphur unites easily with all metals; gold, platinum, and zinc, excepted. The compounds, except that with mercury, possess a metallic lustre without any ductility. The sulphur may be separated by exposing the mixture to a strong fire, (see METALLURGY,) or by dissolving the metalline part in acids. The sulphur, however, defends several of the metals from the action of acids; so that this dissolution succeeds but imperfectly. The reguline part of antimony is more easily separated from sulphur by means of acids, than any other metalline substance. Alkaline salts will separate the sulphur from all metals in fusion, but they unite with it themselves, and form a compound equally capable of dissolving the metal. (See ALKALINE SALTS.)

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Vermilion.

Sulphur united with quicksilver, forms the beautiful pigment called *cinnabar*, or *vermilion*; which is so much used in painting, that the making of it is become a distinct trade. Neuman relates, that in the making of cinnabar by the Dutch method, six or eight parts of quicksilver are made use of to one of sulphur. The sulphur is first melted; and then the quicksilver is stirred into it; upon which they unite into a black mass. In this part of the process the mixture is very apt to take fire; of which it gives notice by swelling up to a great degree. The vessel must then be immediately covered. The mass being beaten to powder, is afterwards to be sublimed in large earthen jars almost of an equal wideness from end to end; these are hung in a furnace by a strong rim of iron. When the matter is put in, the mouth of the vessel is covered, the fire increased by degrees, and continued for several hours, till all the cinnabar has sublimed; care being taken to introduce at times an iron-rod to keep the middle clear; otherwise the cinnabar concreting there, and stopping up the passage, would infallibly burst the vessels.

The quantity of sulphur directed in the common receipts for making cinnabar is greatly larger than the above; being no less than one-third of the quantity of quicksilver employed: accordingly it has been found, that the sublimate, with such a large quantity of sulphur, turned out of a blackish colour, and required to be several times sublimed before it became perfectly red; but we cannot help thinking, that by one gentle sublimation the superfluous sulphur might be separated, and the cinnabar become perfectly pure the second time. Hoffman gives a curious method of making cinnabar without sublimation; by shaking, or digesting a little mercury with volatile tincture of sulphur: the mercury readily imbibes the sulphur from the volatile spirit, and forms with it a deep red powder, not inferior in colour to the cinnabar prepared in the common manner. Dr Lewis has found the common solu-

tions of sulphur by alkalies, or quicklime, to have a similar effect. This cinnabar will likewise be of a darker or lighter colour, according as the solution contains more or less sulphur.

Sulphur is a principal ingredient in gun-powder, (see GUN-POWDER.) It also enters the composition of the *pulvis fulminans*. This consists of three parts of nitre, two of the dry alkali of tartar, and one part of sulphur, well ground together. If a little quantity of this powder is laid on an iron-spoon, or shovel, and slowly heated, it will explode, when it arrives at a certain degree of heat, with astonishing violence and noise. The most probable opinion concerning this is, that the fixed air contained in the alkali is, by the acid vapours acting upon and endeavouring to expel it all at once, driven off with such force, that a loud explosion is produced.

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Pulvis fulminans.

2. *Phosphorus of Urine*. This is a very inflammable substance, composed of phlogiston united with a certain acid, the properties of which we have already taken notice of, n° 307—310. The preparation of it was long a secret, and only perfectly discovered by Mr Margraaf, who published it in the Berlin Memoirs in 1743. This process being by far the best, and most practicable, we shall content ourselves with inserting it alone.

476
Phosphorus of urine.

Two pounds of sal ammoniac are to be accurately mixed with four pounds of minium, and the mixture distilled in a glass-retort; by which means a very penetrating, caustic alkaline spirit will be obtained. The residuum, after the distillation, is a kind of *plumbum corneum*; n° 149. This is to be mixed with nine or ten pounds of extract of urine, evaporated to the consistence of honey. (Seventy or eighty gallons of urine are required to produce this quantity of extract.) The mixture is to be made slowly in an iron pot set over the fire, and the matter frequently stirred. Half a pound of powdered charcoal is then to be added, and the evaporation continued till the whole is reduced to a black powder. This powder is to be put into a retort; and urged with a graduated heat, till it becomes red hot, in order to expel all the volatile alkali, fetid oil, and ammoniacal salt, that may be contained in the mixture. After the distillation, a black friable residuum remains, from which the phosphorus is to be extracted by a second distillation, and a stronger heat. Before it is subjected to another distillation, it may be tried by throwing some of it upon hot coals. If the matter has been well prepared, a smell of garlic exhales from it, and a blue phosphorical flame is seen undulating along the surface of the coals.

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Mr Margraaf's process for making.

The matter is to be put into a good earthen retort, capable of sustaining a violent fire. Three quarters of the retort are to be filled with the matter which is to yield the phosphorus, and it is to be placed in a furnace capable of giving a strong heat. Mr Margraaf divides the matter among six retorts, so that if any accident happens to one, the whole matter is not lost. The retorts ought to be well luted to a receiver of a moderate size, pierced with a small hole, and half full of water; and a small wall of bricks must be raised between the furnace and receiver, in order to guard this vessel against heat, as much as possible. The retorts are to be heated by slow degrees for an hour and an half; then the heat is to be increased till the vessels

are

PRACTICE are red hot, when the phosphorus ascends in luminous vapours. When the retort is heated till between a red and white, the phosphorus passes in drops, which fall and congeal in the water at the bottom of the receiver. This degree of heat is to be continued till no more comes over. When a retort contains eight pints or more, this operation continues about five hours.

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Rectification
of phosphorus.

In the first distillation, phosphorus never passes pure, but is always of a blackish colour, by reason of its carrying along with it some part of the coal. From this, however, it may be purified, by rectification in a small glass-retort, to which is luted a receiver half full of water. A very gentle heat is sufficient; because phosphorus, once formed, is very volatile; and as the fuliginous matter was raised probably by the fixed air emitted by the charcoal, in the instant of its union with the phosphoric acid, none of it can arise in a second distillation.

The phosphorus is then to be divided into small cylindrical rolls, which is done by putting it in glass-tubes immersed in warm water; for the phosphorus is almost as fusible as fuel. It takes the form of the glass-tubes; from which it may be taken out, when it is cold and hardened. This must be done under water, least the phosphorus should take fire.

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Process
Sometimes
dangerous.

This concrete continually appears luminous in a dark place; and by a very slight heat takes fire, and burns far more vehemently than any other known substance. Hence, it is necessary to be very cautious in the distillation of it; for if the receiver should happen to break while the phosphorus is distilling, and a little flaming phosphorus fall upon the operator's legs or hands it would burn its way to the bone, in less than three minutes. In this case, according to Mr Hellot, nothing but urine will stop its progress.

Though phosphorus takes fire very readily by itself, it does not inflame at all by grinding it with other inflammable bodies, as camphor, gun-powder, or essential oils. In grinding it with nitre, some luminous flashes are observed; but the mixture never burns, unless the quantity of phosphorus be large in proportion to the nitre: rubbed pretty hard on a piece of paper or linen, it sets them on fire if they are rough, but not if they are smooth. It fires written paper more readily than such as is white, probably from the former having more asperities. On grinding with iron filings, it presently takes fire.

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Liquid
phosphorus.

Oils ground with phosphorus, appear, like itself, luminous in a temperately warm place; and thus become a liquid phosphorus, which may be rubbed on the hands, &c. without danger. Liquid phosphorus is commonly prepared by grinding a little of the solid phosphorus with oil of cloves, or rubbing it first with camphor, and this mixture with the oil. A luminous *amalgam*, as it is called, may be obtained, by digesting a scruple of solid phosphorus with half an ounce of oil of lavender, and, when the phosphorus begins to dissolve and the liquor to boil, adding a drachm of pure quicksilver; then briskly shaking the glass for five or six minutes, till they unite.

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Experiments
on phosphorus
with spirit
of wine.

Rectified spirit of wine, digested on phosphorus, extracts a part of it, so as to emit luminous flashes on being dropt into water. It is computed that one part

of phosphorus will communicate this property to 600,000 parts of spirit. The liquor is never observed to become luminous of itself, nor in any other circumstance except that above mentioned. By digestion for some months, the undissolved phosphorus is reduced to a transparent oil, which neither emits light, nor concretes in the cold. By washing with water, it is in some measure revived; acquiring a thicker consistence, and becoming again luminous, though in a less degree than at first. During this digestion, the glass is very apt to burst.

Phosphorus is partially dissolved by expressed oils; and totally, or almost so, in essential oils, and ether. When essential oils are saturated with it by heat, a part of the phosphorus separates, on standing in the cold, in a crystalline form. Concentrated spirit of salt has no action on it. In distillation, the spirit rises first, and the phosphorus after it unchanged. Spirit of nitre dissolves it, and the dissolution is attended with great heat and copious red fumes, so that great part of the spirit distils without the application of any external heat, and the phosphorus at last takes fire, explodes, and bursts the vessels. Oil of vitriol, likewise, dissolves phosphorus, but not without a heat sufficient to make the acid distil. The distilled liquor is white, thick, and turbid; the residuum is a whitish tenacious mass, which deliquesces, but not totally, in the air. Phosphorus itself is resolved into an acid liquor on being exposed two or three weeks to the air, its inflammable principle seeming by degrees to be dissipated.

Phosphorus has been reported to produce extraordinary effects in the resolution of metallic bodies: but from the experiments that have been made with this view, it does not appear to have any remarkable action on them; at least on the precious ones, gold and silver, for the resolution or subtilization of which it has been chiefly recommended. The following experiments were made by Mr Margraaf.

1. A scruple of filings of gold were digested with a drachm of phosphorus for a month, and then committed to distillation. Part of the phosphorus arose, and part remained above the gold, in appearance resembling glass: this grew moist on the admission of air, and dissolved in water, leaving the gold unaltered. Half a drachm of fine silver, precipitated by copper, being digested with a drachm of phosphorus for three hours, and the fire then increased to distillation, the greatest part of the phosphorus arose pure, and the silver remained unchanged. Copper filings being treated in the same manner, and with the same quantity of phosphorus, the phosphorus sublimed as before; but the remaining copper was found to have lost its metallic brightness, and to take fire on the contact of flame. Iron filings suffered no change. Tin filings run into granules, which appeared to be perfect tin. Filings of lead did the same. The red calx of mercury, called *precipitate per se*, treated in the same manner, was totally converted into running quicksilver. 2. Regulus of antimony suffered no change itself, but occasioned a change in the consistence of the phosphorus, which, after being distilled from this semi-metal, refused to congeal, and continued under water, fluid like oil-olive. With bismuth there was no alteration. A drachm of

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With essen-
tial oils and
acids.

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Mr Margraaf's ex-
periments
with metals.

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Mr Canton's phosphorus.

3. *Mr Canton's phosphorus*. This is a composition of quicklime and common sulphur. The receipt for making it is as follows. " Calcine some common oyster-shells, by keeping them in a good coal-fire for half an hour ; let the purest part of the calx be pulverized and sifted. Mix with three parts of this powder, one part of flowers of sulphur. Let this mixture be rammed into a crucible of about an inch and a half in depth, till it be almost full ; and let it be placed in the middle of the fire, where it must be kept red hot for one hour at least, and then set by to cool : when cold, turn it out of the crucible ; and cutting or breaking it to pieces, scrape off, upon trial, the brightest parts ; which, if good phosphorus, will be a white powder." This kind of phosphorus shines on being exposed to the light of the sun, or on receiving an electrical stroke.

4. *Phosphorus of Homberg*. This substance, which has the singular property of kindling spontaneously when exposed to the air, was accidentally discovered by Mr Homberg, as he was endeavouring to distil a clear flavourless oil from human excrements. Having mixed the excrement with alum, and distilled over as much as he could with a red heat, he was much surprised at seeing the matters left in the retort take fire upon being exposed to the air, some days after the distillation was over. This induced him to repeat the operation, in which he met with the same success ; and he then published a process wherein he recommended alum and human excrement for the preparation of the phosphorus. Since his time, however, the process has been much improved ; and it is discovered, that almost every vitriolic salt may be substituted for the alum, and most other inflammable substances for the excrement ; but though alum is not absolutely necessary for the success, it is one of the vitriolic salts that succeed best. The following process is recommended in the Chemical Dictionary.

485
Best method of preparing.

Let three parts of alum and one of sugar be mixed together. This mixture must be dried in an iron shovel, over a moderate fire, till it be almost reduced to a blackish powder or coal ; during which time it must be stirred with an iron spatula. Any large masses must be bruised into powder ; and then it must be put into a glass matrafs, the mouth of which is rather strait than wide, and seven or eight inches long. This matrafs is to be placed in a crucible, or other earthen vessel, large enough to contain the belly of the matrafs, with about a space equal to that of a finger all round it. This space is to be filled with sand, so that

the matrafs shall not touch the earthen vessel. The apparatus is then to be put into a furnace, and the whole to be made red hot. The fire must be applied gradually, that any oily or fuliginous matter may be expelled ; after which, when the matrafs is made red hot, sulphureous vapours exhale : this degree of heat is to be continued, till a truly sulphureous flame, which appears at the end of the operation, has been seen nearly a quarter of an hour : the fire is then to be extinguished, and the matrafs left to cool, without taking it out of the crucible ; when it ceases to be red hot, it must be stopped with a cork. Before the matrafs is perfectly cold, it must be taken out of the crucible, and the powder it contains poured as quickly as possible into a very dry glass vial, with a glass stopper. If we would preserve this phosphorus a long time, the bottle containing it must be opened as seldom as possible. Sometimes it kindles while it is pouring into the glass vial ; but it may be then extinguished by closing the vial expeditiously. A small quantity of this phosphorus laid on paper, and exposed to the air, immediately takes fire, becomes red like burning coals, and emits a strong sulphureous vapour greatly resembling that which arises on decomposing liver of sulphur.

486
Theory.

The most plausible theory of this strange appearance is, that, during the operation, part of the vitriolic acid combines with the phlogiston of the coal, into perfect sulphur ; while part remains imperfectly combined either with the phlogiston, or the earthy basis of the alum. This last part, which is also exceedingly concentrated, probably attracts the moisture of the air so strongly, as to produce the heat requisite for kindling the coal-y matter.

II. ARDENT SPIRITS.

See FERMENTATION AND DISTILLATION.

III. OILS.

1. *Essential Oils*. Those oils are called *essential* which have evidently the smell of the vegetable from which they are drawn. For the method of procuring them, see DISTILLATION. They are distinguished from all others by their superior volatility, which is so great as to cause them rise with the heat of boiling water. All these have a strong aromatic smell, and an acid, caustic taste ; in which respect also they differ from other oils. This taste is thought to proceed from a copious and disengaged acid, with which they are all penetrated. The presence of this disengaged acid in essential oils, appears from the impression they make upon the corks of bottles in which they are kept. These corks are always stained of a yellow colour, and a little corroded, nearly as they are by nitrous acid. The vapour of these oils also reddens blue paper, and converts alkalis into neutral salts.

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Essential oils.

488
Supposed cause of their taste.

This acid is likewise supposed to be the cause of their solubility in spirit of wine. They are not all equally soluble in this menstruum, because they do not all contain an equal quantity of acid. As this acid is much disengaged, they lose a great deal of it by repeated distillations, and therefore they become less and less soluble on being frequently distilled. By evaporation they lose their most volatile and thin part, in which the specific smell of the vegetable from which

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Of their solubility in spirit of wine.

which they are extracted refides; by which lofs they become thick, and acquire the fmell and confidence of turpentine, and even of refin. In this ftate they are no longer volatile with the heat of boiling water; and, if diftilled with a ftrouger fire, they give over an oil which has neither fmell nor tafte of the vegetable whence they were extracted, but is entirely empyreumatic, and fimilar to thofe oils procured by diftilling vegetable or animal fubftances with a ftong fire. See DISTILLATION.

To the clafs of effential oils, the volatile concrete called camphor feems moft properly to belong. With them it agrees in its properties of inflammability, folubility in fpirit of wine, and a ftong aromatic flavour. The only differences between them are, that camphor is always in a folid ftate, and is incapable of decomposition by any number of fublimations.

According to Neuman, all the camphor made ufe of is the produce of two fpecies of trees; the one growing in Sumatra and Borneo, the other in Japan. Of thefe, the Japan kind is the only one brought into Europe. The tree is about the fize of a large lime, the flowers white, and the fruit a fmall red berry. All parts of the tree are impregnated with camphor; but the roots contain moft, and therefore are chiefly made ufe of for the preparation of this commodity; though, in want of them, the wood and leaves are fometimes mixed.

The camphor is extracted by diftillation with water in large iron pots filled with earthen heads ftuffed with ftraw; greateft part of the camphor concretes among the ftraw, but part paffes down into the receiver among the water. In this ftate it is found in fmall bits like gray falt-petre, or common bay-falt; and requires to be purified either by a fecond fublimation, or by diffolution in fpirit of wine, filtration, and exficcation. If the firft method is followed, there will be fome difficulty in giving it the form of a perfect transparent cake. A difficulty of this kind indeed always occurs in fublimations, and the only way is to keep the upper part of the glafs of fuch a degree of heat as may keep the fubimate in a half-melted ftate. Dr Lewis recommends the depuration of camphor by fpirit of wine, and then melting it into a cake in the bottom of a glafs.

Camphor poffeffes confiderable antifeptic virtues; and is a good diaphoretic without heating the conftitution, with which intention it is often ufed in medicine. It is likewife employed in fire-works and feveral other arts, particularly in making varnifhes. See VARNISH.

This fubftance diffolves eafily and plentifully in vinous fpirits and in oils; four ounces of fpirit of wine will diffolve three of camphor. On diftilling the mixture, the fpirit rifes firft, very little camphor coming over with it. This fhows that camphor, however volatile it may feem by its fmell, is very far from having the volatility of ether, and confequently is improperly claffed with fubftances of that kind. It is diffolved, but not altered in the leaft, by the ftroongeft mineral acids; always feparating from them in its proper form, on the affufion of water. It may however be changed into a fluid oil by repeated diftillations from bole or other loamy earths.

2. *Empyreumatic Oils.* Under this name are comprehended all thofe oils, from whatever fubftance obtained, which require a greater heat for their diftillation than that of boiling water. Thefe are partially foluble in fpirit of wine, and become more and more fo by repeated diftillations. The empyreumatic oils obtained from animal fubftances are at firft more feid than thofe procured from vegetables; but by repeated diftillations, they become exceedingly attenuated and volatile, becoming almoft as white, thin, and volatile, as ether. They then acquire a property of ading upon the brain and nervous fyftem, and of allaying its irregular movements, which is common to them with all other inflammable matters when highly attenuated and very volatile; but this kind of oil is particularly recommended in epileptic and convulfive affections. It is given from four to 10 or 12 drops: but, though prepared with the utmoft care, it is very fufceptible of lofing its whitenefs, and even its thinnefs, by a fhort expofure to air; which proceeds from the almoft infantaneous evaporation of its more thin and volatile parts, and from the property which the left volatile remainder has of acquiring colour. To avoid this inconvenience, it muft be put, as foon as it is made, into very clean glafs bottles with glafs ftoppers, and expofed to the air as little as poffible.

The moft important obfervations concerning the method of making the pure animal oil are, firft to change the veffels at each diftillation, or at leaft to make them perfectly clean; for a very fmall quantity of the thicker and left volatile part is fufficient to fpoil a large quantity of that which is more rectified. In the fecond place, Mr Beaume has obferved, that this operation may be greatly abridged, by taking care to receive none but the moft volatile part in each diftillation, and to leave a large refiduum, which is to be neglected, and only the more volatile part to be further rectified. By this method a confiderable quantity of fine oil may be obtained at three or four diftillations, which could not otherwife be obtained at fifty or fixty.

3. *Animal Fats.* Though thefe differ confiderably from one another in their external appearance, and probably in their medicinal qualities, they afford, on a chemical analyfis, products fimilar in quality, and differing but inconfiderably in quantity. They all yield a large proportion of oil, and no volatile falt; in which refpect they differ from all other animal fubftances. Two ounces of hog's lard yielded, according to Neuman, two drachms of an empyreumatic liquor, and one ounce five drachms and 50 grains of a clear brown-coloured oil of a volatile fmell, fomewhat like horfe-radifh. The *caput mortuum* was of a fhining black colour, and weighed 10 grains.

Tallow being diftilled in the fame manner, two drachms of empyreumatic liquor were obtained from two ounces of it; of a clear brown oil, fmelling like horfe-radifh, one ounce fix drachms and 12 grains. The remaining coal was of a fhining black colour, and weighed 18 grains.

The marrow of bones differs a little from fats, when chemically examined. Four ounces of frefh marrow, diftilled in the ufual manner, gave over three drachms and a fcruple of a liquor which fmelled like tal-
low;

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low; two scruples and an half of a liquor which had more of an empyreumatic and a foetid smell; two ounces and an half of a yellowish-brown, butyraceous oil, which smelled like horle-radish; and six drachms and an half of a blackish-brown oil of the same smell. The *caput mortuum* weighed four scruples.

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Rancid oils
purified.

All animal fats, when perfectly pure, burn totally away without leaving any feces, and have no particular smell. In the state in which we commonly find them, however, they are exceedingly apt to turn rancid, and emit a most disagreeable and noxious smell; and to this they are peculiarly liable, when long kept in a gentle degree of heat. In this state, too, an inflammable vapour arises from them, which when on fire is capable of producing explosions. Hence, in those works where large bellows are used, they have been often suddenly burst by the inflammable vapours arising from the rancid oil employed for softening the leather. The expressed unctuous oils of vegetables are subject to the same changes: but from this rancidity they may all be freed most effectually, by the simple process of agitating them well with water; which is to be drawn off, and fresh quantities added, till it comes off, at last, clear and insipid, without any ill smell. The proper instrument for performing this operation in large, is a barrel-churn, having in it four rows of narrow split deals, from the center to the circumference, each piece set at obtuse angles to the other, in order to give different directions to the oil and water as the churn turns round, thereby to mix them more intimately. The churn is to be swiftly turned round for a few minutes; and must then be left at rest, till the oil and water have fully separated; which will be in 15 or 20 minutes, more or less, according to the size of the churn. When this water is drawn off, fresh water is to be put in, and the churn again turned round, and this continued till the oil is perfectly sweet. If the oil and water are allowed to stand together for some days, a gelatinous substance is found between them, which is not very easily miscible either with oil or water. Chalk, quicklime, and alkaline salts, are found also capable of taking off the rancidity from oils and fats; but have the inconvenience of destroying a part of their substance.

IV. RESINS and BALSAMS.

These are commonly reckoned to be composed of an essential oil thickened by an acid; as the essential oils themselves are found to be convertible into a simillar substance, by the exhalation of their more volatile parts. True resins are generally transparent in a considerable degree; soluble in spirit of wine; and possessed of a considerable degree of flavour.

498
Whence
procured.

Resins are originally produced by inspissating the natural juices which flow from incisions made in the stems of growing vegetables, and are in that state called *balsams*. The balsams may be considered as essential oils thickened by losing some of their odoriferous principle, and of their finest and most volatile part. There are several kinds of balsams; which, however, differ from each other only in the smell, and degree of consistence; and, therefore, all yield simillar products on distillation. An analysis of turpentine therefore will be sufficient as an example

of the analysis and natural properties of all the rest.

The true turpentine-tree is found in Spain and the southern parts of France, as well as in the island of Chio and in the Indies. It is a middling sized evergreen tree, with leaves like those of the bay, bearing purplish, imperfect flowers; and, on separate pedicles, hard, unctuous berries, like those of juniper. It is extremely resinous; and, unless the resin is discharged, decays, produces fungous excrescences, swells, bursts, and dies; the prevention of which consists wholly in plentiful bleeding, both in the trunk and branches. The juice is the *Chio* or *Cyprus turpentine* of the shops. This sort is quite of a thick consistence, of a greenish white colour, clear and transparent, and of scarcely any taste or smell.

The kind now called *Venice turpentine*, is no other than a mixture of eight parts of common yellow or black rosin with five parts of oil of turpentine. What was originally Venice turpentine is now unknown. Neuman relates, that the Venice turpentine sold in his country was no other than that prepared from the larix tree, which grows plentifully in some parts of France, as also in Austria, Tyrol, Italy, Spain, &c. Of this there are two kinds; the young trees yielding a thin limpid juice, resembling balm of copaiba; the older, a yellower and thicker one.

The *Straßburgh turpentine* is extracted from the silver-fir. Dr Lewis takes notice that some of the exotic firs afford balsams, or resins, superior to those obtained from the native European ones; as particularly that called *balm of Gilead fir*, which is now naturalized to our own climate. A large quantity of an elegant resinous juice may be collected from the cones of this tree: the leaves also, when rubbed, emit a fragrant smell; and yield, with rectified spirit, an agreeable resinous extract.

The common turpentine is prepared from different sorts of the pine; and is quite thick, white, and opaque. Even this is often counterfeited by mixtures of rosin and common expressed oils.

All the turpentines yield a considerable proportion of essential oil. From sixteen ounces of Venice turpentine, Neuman obtained, by distillation with water, four ounces, and three drachms of oil. The same quantity distilled, without addition, in the heat of a water bath, gave but two ounces and an half; and from the residuum treated with water, only an ounce could be obtained. The water remaining in the still is found to have imbibed nothing from the turpentine: on the contrary, the turpentine is found to imbibe part of the water; the residuum and the oil amounting to a full ounce on the pound more than the turpentine employed. When turpentine is distilled, or boiled with water till it becomes solid, it appears yellowish; when the process is further continued, of a reddish brown colour: in the first state, it is called *boiled turpentine*; and in the latter, *colophony*, or *resin*.

On distilling sixteen ounces of turpentine in a retort with an open fire, increased by degrees, we obtain first four ounces of a limpid colourless oil; then two ounces and two drachms of a yellowish one; four ounces and three drachms of a thicker yellow oil; and two ounces and one drachm of a dark brownish

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499
Turpen-
tine Chio.

500
Venice.

501

Straßburgh.

502

Common.

503

Phenomena on distillation.

PRACTICE ish red empyreumatic oil, of the consistence of balsam, and commonly called *balsam of turpentine*.

504
Essential
oil difficult
of solution. The limpid essential oil called *spirit of turpentine*, is exceedingly difficult of solution in spirit of wine; though turpentine itself dissolves with great ease. One part of the oil may indeed be dissolved in seven parts of rectified spirit; but, on standing for some time, the greatest part of the oil subsides to the bottom, a much greater proportion of spirit being requisite to keep it dissolved.

505
Benzoïn. 2. *Benzoïn*: This is a very brittle brownish resin, of an exceedingly fragrant smell. The tree which produces benzoïn is a native of the East Indies; particularly of Siam, and the island of Sumatra. It is never permitted to exceed the sixth year; being, after this time, unfit for producing the benzoïn. It is then cut down, and its place supplied by a young tree raised commonly from the fruit. One tree does not yield above three pounds of benzoïn.

A tree supposed to be the same with that which affords benzoïn in the East Indies, is plentiful also in Virginia and Carolina; from whence it has been brought into England, where it grows with vigour in the open ground. The bark and the leaves have the smell of benzoïn; and yield with rectified spirit a resin of the same smell: but no resin has been observed to issue from it naturally in this climate; nor has any benzoïn been collected from it in America.

506
Soluble in
spirit of
wine. Benzoïn dissolves totally in spirit of wine into a blood-red liquor, leaving only the impurities, which commonly amount to no more than a scruple on an ounce. To water, it gives out a portion of saline matter of a peculiar kind, volatile and sublimable in the fire; and which is most effectually freed by sublimation.

507
Flowers of
benzoïn. This substance, called *flowers of benzoïn*, is best prepared by moistening benzoïn, grossly powdered, with spirit of wine; and then proceeding to distillation with a very gentle heat, in a wide-necked glass-retort. The flowers arise immediately after the spirit, partly in a concrete saline form, and partly in that of a white butter. The receiver being now changed, and the fire increased, a small portion of brown-coloured flowers sublimes; followed, first, by a subtile oil; afterwards by a brownish oil; and last of all by a black, thick, empyreumatic one, together with an acid spirit. If the flowers and butter be dissolved in distilled water, over a gentle fire, the solution filtered, and set in the cold, the saline matter shoots into crystalline concretions of a fine silver whiteness; this salt, like tartar, being difficult of solution; and, when dissolved in hot water, separating again as the liquor cools. The dissolution and filtration should be performed as expeditiously, and the vessel kept as much covered, as possible, to prevent any considerable dissipation of the volatile matter. The salt still retains, even after this purification, a portion of oil; as appears from its penetrating smell, and from its burning in the fire. The spirit of wine, which arises at first in the distillation, is impregnated with a little of the salt. The oil which follows the flowers, re-distilled from earthy powders, or with water, may be used as an essential oil of benzoïn; for it has little or nothing of an empyreumatic taint. From 16 ounces of benzoïn are obtained two

PRACTICE ounces of rough flowers, nine ounces of oil, and seven scruples of an acid spirit. The residuum weighs two ounces and an half.

The principal use of resins is in the making of lacquers, varnishes, &c. See VARNISH.

V. BITUMENS.

These are inflammable mineral bodies, not sulphureous, or only casually impregnated with sulphur. They are of various degrees of consistency; and seem, in the mineral kingdom, to correspond with the oils and resins in the vegetable.

Concerning the origin of bitumens, chemists are not at all agreed. Some chemical writers, particularly Mr Macquer, imagine bitumens to be no other than vegetable resins altered in a particular manner by the admixture of some of the mineral acids in the earth; but Dr Lewis is of a contrary opinion, for the following reasons.

“Mineral bitumens are very different in their qualities from vegetable resins; and, in the mineral kingdom, we find a fluid oil very different from vegetable oils. The mineral oil is changed by mineral acids into a substance greatly resembling bitumens; and the vegetable oils are changed by the same acids into substances greatly resembling the natural resins.” (Here we cannot help differing from the Doctor, as we have never seen or heard of any instance of such a change taking place, on mixing a mineral acid with any vegetable oil, either expressed or distilled.) “From bitumens we obtain, by distillation, the mineral oil, and from resins the vegetable oil, distinct in their qualities as at first. Vegetable oils and resins have been treated with all the known mineral acids; but have never yielded any thing similar to the mineral bitumens. It seems, therefore, as if the oily products of the two kingdoms were essentially and specifically different. The laws of chemical inquiries at least demand, that we do not look upon them any otherwise, till we are able to produce from one a substance similar to the other. When this shall be done, and not before, the presumption that nature effects the same change in the bowels of the earth, will be of some weight.”

There is a perfectly fluid, thin bitumen, or mineral oil, called *naphtha*, clear and colourless as crystal; of a strong smell; extremely subtile; so light as to swim on all known liquors, ether perhaps excepted; spreading to a vast surface on water, and exhibiting rainbow-colours; highly inflammable: formerly made use of in the composition of the supposed inextinguishable greek fire.

Next to this in consistence is the *oleum petra*, or *petroleum*; which is grosser and thicker than naphtha, of a yellowish, reddish, or brownish colour; but very light, so as to swim even on spirit of wine. By distillation, the petroleum becomes thinner and more subtile, a gross matter being left behind; it does not, however, easily arise, nor does it totally lose its colour by this process, without particular managements or additions.

Both naphtha and petroleum are found plentifully in some parts of Persia, trickling through rocks, or swimming on the surface of waters. Kemper gives an account of two springs near Baku; one affording naphtha,

508
Origin of
bitumens.

509
Naphtha

510
Petroleum.

PRACTICE naphtha, which it receives in drops from subterraneous veins; the other, a blackish and more terid petroleum, which comes from Mount Caucasus. The naphtha is collected for making varnishes; the petroleum is collected in pits, and sent to different places for lamps and torches.

Native petrolea are likewise found in many different places, but are not to be had in the shops; what is sold there for petroleum, being generally oil of turpentine coloured with alkanet root. The true naphtha is recommended against disorders of the nerves, pains, cramps, and contractions of the limbs, &c.; but genuine naphtha is rarely or never brought to this country.

There are some bitumens, such as amber, ambergrease, pit-coal, and jet, perfectly solid; others, such as Barbadoes tar, of a middle consistence between fluid and solid. Turf and peat are likewise thought to belong to this class.

511
Amber.

1. *Amber*. This substance melts, and burns in the fire, emitting a strong peculiar smell. Distilled in a strong heat, it yields a phlegm; an oil; and a particular species of acid salt, (n° 313, — 315). The distillation is performed in earthen or glass-retorts, frequently with the addition of sand, sea-salt, coals, &c. which may break the tenacity of the melted mass, so as to keep it from swelling up, which it is apt to do by itself. These additions, however, make a perceptible difference in the produce of the distillation: with some, the salt proves yellowish and dry; with others, brownish or blackish, and unctuous or soft like an extract: with some, the oil is throughout of a dark-brown colour; with others, it proves externally green, or greenish; with elixated ashes, in particular, it is of a fine green. The quantity of oil and phlegm is greatest when coals are used, and that of salt when sea-salt is used.

512
Mostadvan-
taneously
distilled
without ad-
dition.

The most advantageous method of distilling amber, however, is without any addition; and this is the method used in Prussia, where the greatest quantities of salt and oil of amber are made. At first a phlegmatic liquor distils; then a fluid oil; afterwards one that is thicker and more ponderous; and last of all, an oil still more ponderous along with the salt. In order to collect the salt more perfectly, the receiver is frequently changed; and the phlegm, and light oil, which arise at first, are kept by themselves. The salt is purified, by being kept some time on bibulous paper, which absorbs a part of the oil; and changing the paper as long as it receives any oily stain. For the further depuration as well as the nature of this salt, see **SUCCINUM**.

513
Amber-
grease.

2. *Ambergrease*. This concrete, which is only used as a perfume, yields, on distillation, products of a similar nature to that of amber, excepting that the volatile salt is in much less quantity. See **AMBERGREASE**.

514
Pit-coal.

3. *Pit-coal*. [See the articles **COALERIES** and **LITHANTHRAX**]. This substance yields by distillation, according to the translator of the Chemical Dictionary, 1. a phlegm, or water; 2. a very acid liquor; 3. a thin oil, like naphtha; 4. a thicker oil, resembling petroleum, which falls to the bottom of the former, and which rises with a violent fire; 5. an acid, concrete salt; 6. an *uninflammable earth*, (we suppose he means a piece of charred coal, or cin-

der), remains in the retort. The fluid oil obtained from coals is said to be exceedingly inflammable, so as to burn upon the surface of water, like naphtha itself.

4. *Peat*. There are very considerable differences in this substance, proceeding probably from the admixture of different minerals: for the substance of peat is plainly of vegetable origin; whence it is found to answer for the smelting of ores, and the reduction of metallic calces, nearly in the same manner as coals of wood. Some sorts yield, in burning, a very disagreeable smell, which extends to a great distance; whilst others are inoffensive. Some burn into grey or white, and others into red, ferruginous ashes. The ashes yield, on elixation, a small quantity of alkaline, and some neutral salt.

The smoke of peat does not preserve or harden flesh like that of wood; and the foot into which it condenses is more apt to liquefy in moist weather. On distilling peat in close vessels, there arises a clear insipid phlegm; an acid liquor; which is succeeded by an alkaline one, and a dark-coloured oil. The oil has a very pungent taste, and an empyreumatic smell; less fetid than that of animal substances, but more so than that of mineral bitumens. It congeals, in the cold, into a pitchy mass, which liquefies in a small heat: it readily catches fire from a candle; but burns less vehemently than other oils, and immediately goes out upon removing the external flame. It dissolves almost totally in rectified spirit of wine, into a dark, brownish-red, liquor.

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Peat.

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Phenomena
on distilla-
tion.

VI. CHARCOAL.

This is the form to which all inflammable matters are reducible, by being subjected to the most vehement action of fire in close vessels; but though all the coals are nearly similar to one another in appearance, there is nevertheless a very considerable difference among them as to their qualities. Thus the charcoal of vegetables parts with its phlogiston very readily, and is easily reducible to white ashes; charred pit-coal, or, as it is commonly called, *coak*, much more difficultly; and the coals of burnt animal-substances, far more difficultly than either of the two. Mr Macquer acquaints us, that the coal of bullock's blood parts with its phlogiston with the utmost difficulty. He kept it very red, in a shallow crucible, surrounded with charcoal, for six hours and more, stirring it constantly that it might be all exposed to the air, without being able to reduce it to white, or even grey ashes. It still remained very black, and full of phlogiston. The coals of pure oils, or concrete oily substances, and foot, which is a kind of coal raised during the inflammation of oils, are as difficultly burnt as animal coals. These coals contain very little saline matter, and their ashes furnish no alkali. These coals, which are so difficultly burnt, are also less capable of inflaming with nitre than others more combustible; and some of them, in a great measure, resist even the action of nitre itself.

Charcoal is the most refractory substance in nature; no instance having been known of its ever being melted, or shewing the least disposition to fusion, either by itself, or with additions: hence, charcoal is found to be the most proper support for such bodies as are to be exposed to the focus of a large burning glass.

517
Differences
between the
coals of dif-
ferent sub-
stances.

518
Charcoal
perfectly
refractory.

The

PRACTICE The only true solvent of charcoal is *hepar sulphuris*. See n° 325.

The different quantities of phlogiston contained in different coals, and perhaps some other circumstances, render some kinds of charcoal much less fit to be used in reviving metals from their cakes, or in smelting them originally from their ores. The coals of vegetable substances are found to answer best for this purpose. See METALLURGY.

SECT. V. Vegetable and Animal Substances.

THE only substances afforded by vegetables or animals, which we have not yet examined, are the mucilaginous, or gummy; and the colouring parts obtained by infusion, or boiling in water. The last of these are treated of under the article *COLOUR-Making*, to which we refer; and in this section shall only consider the nature of mucilage, or gum.

519
Mucilage.

The mucilage of vegetables is a clear transparent substance, which has little or no taste or smell, the consistence of which is thick, ropy, and tenacious, when united with a certain quantity of superabundant water. It is entirely and intimately soluble in water, and contains no disengaged acid or alkali.

When mucilage is dissolved in a large quantity of water, it does not sensibly alter the consistence of the liquor: but, by evaporation, the water grows more and more thick; and, at last, the matter acquires the consistence of gum-arabic, or glue; and this without losing its transparency, provided a heat not exceeding that of boiling water has been used.

520
Phenomena on distillation.

Gums, and solid mucilages, when well dried and very hard, are not liquefied in the fire like resins, but swell, and emit many watery fumes; which are, at first, watery; then oily, fuliginous, and acrid. Distilled in close vessels, an aqueous acid liquor comes over,

along with an empyreumatic oil, as from other vegetable substances; a considerable quantity of coal remains, which burns to ashes with difficulty.

Mucilages and gums are not soluble either by oils, spirit of wine, alkalies, or acids, except in so far as they dissolve in these liquors by means of the water in which the alkali or acid are dissolved. They are, however, the most effectual means of uniting oil with water. Three parts of mucilage, poured upon one part of oil, will incorporate with it by trituration or agitation; and the compound will be soluble in water. Vegetable gums are used in medicine, as well as the mechanic arts: but the particular uses to which each of them is applicable, will be mentioned under the name of each particular gum.

The mucilage obtained from animal substances, when not too thick, is called *jelly*, or *gelatinous matter*; when further inspissated, the matter becomes quite solid in the cold, and is called *glue*. If the evaporation is still further continued, the matter acquires the consistence of horn.

521
Jelly and glue.

This gelatinous substance seems to be the only true animal one; for all parts of the body, by long continued boiling, are reducible to a jelly, the hardest bones not excepted. Animal jelly, as well as vegetable mucilage, is almost insipid and inodorous; but, though it is difficult to describe the difference betwixt them when apart, it is very easily perceived when they are both together. Acids and alkalies, particularly the latter, dissolve animal jellies with great ease; but the nature of these combinations is not yet understood. The other properties of this substance are common to it with the vegetable gums, except only that the animal mucilage forms a much stronger cement than any vegetable gum; and is therefore much employed for mechanical purposes, under the name of *glue*. See *GLUE*, and *ISINGLASS*.

C H E

CHEMNITZ (Martin), a famous Lutheran divine, the disciple of Melancthon, was born at Britzen in Brandenburg, in 1522. He was employed in several important negotiations by the princes of the same communion; and died in 1589. His principal work is, the *Examen of the Council of Trent*, in Latin.

CHEMOSH. See CHAMOS.

CHEMOSIS, a disease of the eyes, proceeding from an inflammation; wherein the white of the eye swells above the black, and overtops it to such a degree, that there appears a sort of gap between them. Others define it to be an elevation of the membrane which surrounds the eye, and is called the white; being an affection of the eye, like white flesh.

CHENOPODIUM, GOOSE-FOOT, or WILD ORACH; a genus of the dignity order, belonging to the pentandria class of plants. There are 18 species, 13 of which are natives of Britain. The most remarkable are the following: 1. The bonus henricus, or common English mercury, found growing naturally in shady lanes in many places in Britain. It has large triangular, arrow-pointed, entire leaves; upright, thick, striated stalks, garnished with triangular leaves, and terminated by close spikes of apetalous yellowish-green flowers

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in June and July, which are succeeded by ripe seeds in August. 2. The scoparia, belvedere, or annual mock-cypreis. The merit of this consists in its beautiful pyramidal form, resembling a young cypreis tree. 3. The botrys, or oak of Jerusalem. 4. The ambrosioides, or oak of Cappadocia. All these are very easily propagated from seeds; and will thrive best in a rich light earth. Most of the species have an aromatic smell. A species which grows near the Mediterranean is used by the Egyptians in sallads, on account of its saltish aromatic taste. From the same plant, kelp is made in other countries. The first species, or English mercury, was formerly used as spinnach; but is now disused, as being greatly inferior to that herb. As an article of the materia medica, it is ranked among the emollient herbs, but rarely made use of in practice. The leaves are applied by the common people for healing slight wounds, cleansing old ulcers, and other like purposes. The roots are given to sheep that have a cough. Goats and sheep are not fond of the herb; cows, horses, and swine, refuse it.

CHEPELIO, an island in the bay of Panama and province of Darien, in South America, situated about

11 II

three

Chepflow
Chermes.

three leagues from the city of Panama, which it supplies with provisions. W. Long. 81°. N. Lat. 9°.
CHEPSTOW, a market-town of Monmouthshire in England, seated on the river Wye near its mouth, in W. Long. 2. 40. N. Lat. 51. 40.

CHEQ, or CHERIF, the prince of Mecca, who is, as it were, high priest of the law, and sovereign possessor of all the Mahometans of whatever sect or country they be. See CALIPH.

The grand signior, sophis, moguls, khans of Tartary, &c. send him yearly presents, especially tapestry to cover Mahomet's tomb withal, together with a sumptuous tent for himself, and vast sums of money to provide for all the pilgrims during the 17 days of their devotion.

CHERASCO, a strong and considerable town of Italy, in Piedmont, and capital of a territory of the same name, with a strong citadel belonging to the king of Sardinia, where he retired in 1706, during the siege of Turin. It is seated at the confluence of the rivers Sturia and Tanaro, upon a mountain. E. Long. 7. 55. N. Lat. 44. 35.

CHERBURG, a sea-port town of France, in Normandy, with a harbour and Augustine abbey. It is remarkable for the sea-fight between the English and French fleets in 1692, when the latter were beat, and upwards of twenty of their men of war burnt near Cape la Hogne. The British landed here in August 1758, and took the town, with the ships in the basin, demolished the fortifications, and ruined the other works which had been long carried on for enlarging the harbour and rendering it more safe and convenient. E. Long. 1. 38. N. Lat. 49. 38.

CHEREM, among the Jews, is used to signify a species of annihilation. See ANNIHILATION.

The Hebrew word *cherem*, signifies properly to "destroy, exterminate, devote, or anathematise."

CHEREM is likewise sometimes taken for that which is consecrated, vowed, or offered to the Lord, so that it may no longer be employed in common or profane uses. No devoted thing that a man shall devote unto the Lord, of all that he hath of man and beast, and of the field of his possession, shall be sold or redeemed; every devoted thing is most holy to the Lord: none devoted, which shall be devoted of men, shall be redeemed, but shall surely be put to death. There are some who assert that the persons thus devoted were put to death; whereof Jephtha's daughter is a memorable example. Judg. xi. 29, &c.

CHEREM is also used for a kind of excommunication in use among the Jews. See NIDDI.

CHERESOU, or CHARRZUL, a town of Turkey in Asia, capital of Kurdistan, and the seat of a beglerbeg. E. Long. 45. 15. N. Lat. 36. 0.

CHERILUS, of Samos, a Greek poet, flourished 479 years before Christ. He sung the victory gained by the Athenians over Xerxes, and was rewarded with a piece of gold for every verse. His poem had afterwards the honour of being rehearsed yearly with the works of Homer.

CHERLESQUIOR, in Turkish affairs, denotes a lieutenant general of the grand signior's armies.

CHERMES, in zoology, a genus of insects belonging to the order of insecta hemiptera. The rostrum

is situate on the breast; the feelers are longer than the breast; the four wings are deflected; the breast is gibbous; and the feet are of the jumping kind. There are 17 species; and the trivial names are taken from the plants which they frequent, as the chermes graminis, or grass-bug; the chermes ulmi, or elm-bug, &c.

CHERMES Mineral. See KERMES.

CHERRY-ISLAND, an island in the northern ocean, lying between Norway and Greenland, in E. Long. 20. 5. N. Lat. 75. 0.

CHERRY-Tree, in botany. See PRUNES.

CHERSO, an island in the gulph of Venice, with a town of the same name near Croatia, belonging to the Venetians. The air is good, but the soil stony; however, it abounds in wine, cattle, oil, and excellent honey. E. Long. 15. 5. N. Lat. 45. 8.

CHERSONESUS, among modern geographers, the same with a peninsula *. In ancient geography, it was applied to several peninsulas; as the Chersonesus Aurea, Cimbrica, Taurica, and Thracia, now thought to be Malacca, Jutland, Crim Tartary, and Romania. * See Peninsula.

CHERTSEY, a market-town of Surrey in England, about seven miles west from Kingston upon Thames. W. Long. 30°. N. Lat. 51. 25.

CHERUB, (plural, CHERUBIM); a celestial spirit, which in the hierarchy is placed next to the seraphim. See HIERARCHY.

The term *cherub* in Hebrew, is sometimes taken for a calf or ox. Ezekiel sets down the face of a cherub as synonymous to the face of an ox. The word *cherub* in Syriac and Chaldee, signifies to till or plow, which is the proper work of oxen. Cherub also signifies strong and powerful. Grotius says, that the cherubim were figures much like that of a calf. Borchart thinks likewise, that the cherubim were more like to the figure of an ox than to any thing besides; and Spencer is of the same opinion. Lastly, St John, in the Revelations, calls cherubim *beasts*. Josephus says, the cherubim were extraordinary creatures, of a figure unknown to mankind. Clemens of Alexandria believes, that the Egyptians imitated the cherubim of the Hebrews in the representations of their sphinxes and their hieroglyphical animals. All the several descriptions which the Scripture gives us of cherubim differ from one another; but all agree in representing them as a figure composed of various creatures, as a man, an ox, an eagle, and a lion. Such were the cherubim described by Ezekiel. Those which Isaiah saw, and are called *seraphim* by him, had the figure of a man with six wings; with two whereof they covered their faces, with two more they covered their feet, and with the two others they flew. Those which Solomon placed in the temple of Jerusalem, are supposed to have been nearly of the same form. Those which St John describes in the Revelations, were all eyes before and behind, and had each six wings. The first was in the form of a lion, the second in that of a calf, the third of a man, and the fourth of an eagle. The figure of the cherubim was not always uniform, since they are differently described in the shapes of men, eagles, oxen, lions, and in a composition of all these figures put together. Moses likewise calls these symbolical or hieroglyphical representations, which were embroidered on the veils

Chermes
Cherub.

Chervil
Cheine.

of the tabernacle, *cherubim* of costly work. Such were the symbolical figures which the Egyptians placed at the gates of their temples, and the images of the generality of their gods, which were commonly nothing but statues composed of men and animals.

CHERVIL, in botany. See **CEROPHYLLUM**.

CESHIRE, a maritime county of England, bounded by Lancashire on the north; Shropshire and part of Flintshire, on the south; Derbyshire and Staffordshire, on the east and south-east; and Denbighshire, and part of Flintshire, on the west and north-west. It extends in length about 44 miles, in breadth 25; and is supposed to contain 125,000 inhabitants. Both the air and soil in general are good. In many places of the country are peat-mosses, in which are often found trunks of fir-trees, sometimes several feet under ground, that are used by the inhabitants both for fuel and candles. Here also are many lakes and pools well stored with fish; besides the rivers Mersey, Weaver, and Dee, which last falls into a creek of the Irish sea near Chester. This county also abounds with wood; but what it is chiefly remarkable for, is its cheese, which has a peculiar flavour, generally thought not to be inferior to any in Europe. Many conjectures have been formed concerning the reason of this flavour; but Dr Campbell *, with great probability, ascribes it to the salt-rocks which abound here, and of which a great quantity is annually sent to Liverpool, to be there manufactured into salt. As a proof of this, he tells us, that as the brine-spring at Namptwich is the richest in the whole county, and produces the fairest salt; so the town and its neighbourhood is remarkable for the best cheese in all Cheshire. The principal towns are Chester the capital, Cholmondeley, Namptwich, &c.

William the Conqueror erected this county into a palatinate, or county-palatine, in favour of his nephew Hugh Lupus, to whom he granted the same sovereignty and jurisdiction in it that he himself had in the rest of the island. By virtue of this grant, the town of Chester enjoyed sovereign jurisdiction within its own precincts; and that in so high a degree, that the earls held parliaments, consisting of their barons and tenants, which were not bound by the acts of the English parliament: but this exorbitant power of the palatinates was at last reduced by Henry VIII.; however, all cases and crimes, except those of error, foreign-plea, foreign-voucher, and high-treason, are still heard and determined within the shire. The earls were anciently superiors of the whole county, and all the land-holders were mediately or immediately their vassals, and under the like sovereign allegiance to them as they were to the kings of England; but the earldom was united to the crown by Edward III. since which time, the eldest sons of kings of England have always been earls of Chester, as well as princes of Wales. Cheshire sends four members to parliament; two for the county, and two for the capital.

CHESNE (Andrew du), styled the father of French history, was born in 1584. He wrote, 1. A history of the popes. 2. An history of England. 3. An inquiry into the antiquities of the towns of France. 4. An history of the cardinals. 5. A bibliotheca of the authors who have written the history and topogra-

phy of France, &c. He was crushed to death by a cart, in going from Paris to his country-house at Verriere, in 1640.

CHESNUT-TREE. See **FAGUS**.

CHESSE, an ingenious game performed with different pieces of wood, on a board divided into 64 squares or houses; in which chance has so small a share, that it may be doubted whether a person ever lost a game but by his own fault.

Each gamester has eight dignified pieces, *viz.* a king, a queen, two bishops, two knights, and two rooks, also eight pawns: all which, for distinction's sake, are painted of two different colours, as white and black.

As to their disposition on the board, the white king is to be placed on the fourth black house from the corner of the board, in the first and lower rank; and the black king is to be placed on the fourth white house on the opposite, or adversary's end of the board. The queens are to be placed next to the kings, on houses of their own colour. Next to the king and queen, on each hand, place the two bishops; next to them, the two knights; and last of all, on the corners of the board, the two rooks. As to the pawns, they are placed without distinction, on the second rank of the house, one before each of the dignified pieces.

Having thus disposed the men, the onset is commonly begun by the pawns, which march straight forward in their own file, one house at a time; except the first move, when it can advance two houses, but never moves backwards: the manner of their taking the adversary's men, is side-ways, in the next house forwards; where having captivated the enemy, they move forward as before. The rook goes forward or cross-ways through the whole file, and back again. The knight skips backward and forward to the next house, save one, of a different colour, with a sidling march, or a slope, and thus kills his enemies that fall in his way, or guards his friends that may be exposed on that side. The bishop walks always in the same colour of the field that he is placed in at first, forward and backward, alope, or diagonally, as far as he lists. The queen's walk is more universal, as she takes all the steps of the before mentioned pieces, excepting that of the knight; and as to the king's motion, it is one house at a time, and that, either forward, backward, sloping, or side-ways.

As to the value of the different pieces, next to the king is the queen, after her the rooks, then the bishops, and last of the dignified pieces comes the knight. The difference of the worth of pawns, is not so great as that of noblemen; only, it must be observed, that the king's bishop's pawn is the best in the field, and therefore the skilful gamester will be careful of him. It ought also to be observed, that whereas any man may be taken, when he falls within the reach of any of the adversary's pieces, it is otherwise with the king, who, in such a case, is only to be saluted with the word *check*, warning him of his danger, out of which it is absolutely necessary that he move; and, if it so happen that he cannot move without exposing himself to the like inconveniency, it is check-mate, and the game is lost.

Sarrafin has an express treatise on the different opi-

Cheest
||
Chefs.

* Political
Survey of
G. Britain,
I. 326.

Chest
1
Chest.

nions of the origin of the Latin *schacchi*, whence the French *ethes*, and our *chess*, is formed. Menage is also very full on the same head. Leunclavius takes it to come from *Ufcoches*, famous Turkish robbers: P. Sirmond, from the German *schachze*, "theft;" and that from *calculus*. He takes *chess* to be the same with the *ludus latruncularum* of the Romans, but mistakenly. This opinion is countenanced by Vossius and Salmasius, who derive the word from *calculus*, as used for *latrunculus*. G. Tolofanus derives it from the Hebrew, *schach*, *vallavit et mat mortuus*; whence *check* and *check-mate*. Fabricius says, a celebrated Persian astronomer, one Schatrenschia, invented the game of *chess*; and gave it his own name, which it still bears in that country. Nicod derives it from *schogue*, or *seque*, a Moorish word for lord, king, and prince. Bochart adds, that *schach* is originally Persian; and that *schachmat*, in that language, signifies the king is dead.—The opinion of Nicod and Bochart, which is likewise that of Scriverius, appears the most probable.

Dionatus, on Terence's *Eunuch*, observes, that Pyrrhus, the most knowing and expert prince of his age at ranging a battle, made use of the men at *chess* to form his designs, and to shew the secrets thereof to others. Vopiscus, in his life of Proculus, informs us, that one of the Roman emperors had the title Augustus given him, because of his gaining ten games at *chess* successively. Tamerlane is recorded as a very expert gambler at *chess*.—*Chess* is doubtless a most ancient and universal game: the common opinion is, that it was invented by Palamedes at the siege of Troy. Others attribute the invention to Diomedes, who lived in the time of Alexander: the romance of the Rose ascribes it to one Attalus; but the truth is, the game is so very ancient, there is no tracing its author. In China, it makes a considerable part of the education of their maids; and seems to take the place of dancing among us. In Spain, whole cities challenge each other at *chess*. John of Salisbury relates, that in a battle between the French and English in 1117, an English knight seizing the bridle of Louis le Gros, and crying to his comrades, *The king is taken*, that prince struck him to the ground with his sword, saying, *Ne seais tu pas qu' aux echecs on ne prend pas le roy*? "Dost thou not know, that at *chess* the king is never taken?" The reason is, that when the king is reduced to such a pass that there is no way for him to escape, the game ends, without exposing the royal piece to further affront.

Cardinal Cajetan, and other casuists, rank *chess* in the number of prohibited games, as requiring too much application: and Montaign blames it as too serious for a game.

CHESS-TREES, *taquets d'anire*; two pieces of wood bolted perpendicularly, one on the starboard, and another on the larboard side of the ship. They are used to confine the *clue*, or lower corners of the main-sail; for which purpose there is a hole in the upper part, through which the rope passes that usually extends the clue of the sail to windward. See **TACK**.

The chess-trees are commonly placed as far before the main-mast as the length of the main-beam.

CHEST, in commerce, a kind of measure, containing an uncertain quantity of several commodities.

A chest of sugar, *v. g.* contains from ten to fifteen hundred weight; a chest of glass, from two hundred to three hundred feet; of Castile soap, from two and an half to three hundred weight; of indigo, from one and an half to two hundred weight, five score to the hundred.

CHEST, or *Thorax*, in anatomy. See there, Part V.

CHESTER, commonly called *West-Chester*, to distinguish it from many other Chesters in the kingdom; the capital of Cheshire, in England. It is a very ancient city, supposed to have been founded by the Romans; and plainly appears to have been a Roman station by the many antiquities which have been and are still discovered in and about the town. It was among the last places the Romans quitted; and here the Britons maintained their liberty long after the Saxons had got possession of the rest of their country. At present it is a large well-built wealthy city, and carries on a considerable trade. Mr Pennant calls it "a city without parallel," on account of the singular structure of the four principal streets. They are as if excavated out of the earth, and sunk many feet beneath the surface: the carriages drive far beneath the level of the kitchens, on a line with ranges of shops. The houses are mostly of wood, with galleries, piazzas, and covered walls before them, by which not only the shops, but those who are walking about the town, are so hid, that one would imagine there were scarce any inhabitants in it, though it is very populous. But though by this contrivance, such as walk the streets are screened from rain, &c. yet the shops are thereby rendered dark and inconvenient. The back courts of all the houses are on a level with the ground; but to go into any of the four principal streets, it is necessary to descend a flight of several steps. W. Long. 3. 0. N. Lat. 53. 12.

NEW CHESTER, a town of Pennsylvania in America, and capital of a county of that name. It is seated on the Delaware; and has a fine capacious harbour, admitting vessels of any burthen. W. Long. 74. 7. N. Lat. 40. 15.

CHESTERFIELD, a market-town of Derbyshire in England, pleasantly situated on a hill between two small rivers. It has the title of an earldom; and a considerable market for corn, lead, and other country commodities. The houses are, for the most part, built of rough stone, and covered with slate. W. Long. 1. 25. N. Lat. 53. 20.

CHESTERFIELD (Earl of.) See **STANHOPE**.

CHEVAL DE FRISE, a large piece of timber pierced, and traversed with wooden spikes, armed or pointed with iron, five or six feet long. See Plate LXXXIV. fig. 8.

The term is French, and properly signifies a *Friesland horse*; as having been first invented in that country.—It is also called a *Turnpike* or *Turniquet*. See **TURNPIKE**.

Its use is to defend a passage, stop a breach, or make a retrenchment to stop the cavalry. It is sometimes also mounted on wheels, with artificial fires, to roll down in an assault. Errard observes, that the prince of Orange used to inclose his camp with *Chevaux de Frise*, placing them one over another.

CHEVALER,

Chest
1
Cheval.

Chevalier
|
Clayne.

CHEVALER, in the menage, is said of a horse, when, in passing upon a walk or trot, his off fore-leg crosses or overlaps the near fore-leg every second motion.

CHEVALIER, a French term, ordinarily signifying a knight. See KNIGHT. The word is formed of the French *cheval*, "horse;" and the barbarous Latin *caualis*.

It is used, in heraldry, to signify any *cavalier*, or horseman armed at all points; by the Romans called *cataphractus equus*: now out of use, and only to be seen in coat-armour.

CHEVAUX DE FRISE. See CHEVAL *de Frise*.

CHEVIN, a name used in some parts of England for the CHUB.

CHEVIOT, (or TIVIOT) HILLS, run from north to south through Cumberland; and were formerly the borders or boundaries between England and Scotland, where many a bloody battle has been fought between the two nations; one of which is recorded in the ballad of Chevy-chase. See CHASE.

CHEVISANCE, in law, denotes an agreement or composition, as an end or order set down between a creditor and his debtor, &c. In the statutes, this word is most commonly used for an unlawful bargain or contract.

CHEVREAU (Urban), a learned writer, born at Lundun in 1613. He distinguished himself in his youth by his knowledge of the belles lettres; and became secretary of state to queen Christina of Sweden. Several German princes invited him to their courts; and Charles-Lewis, the elector palatine, retained him under the title of counsellor. After the death of that prince, he returned to France, and became preceptor to the duke of Maine. At length retiring to Lundun, he died there in 1701, aged 88. He was the author of several books; and amongst others, of an Universal History, which has been often reprinted.

CHEVRON, or CHEVERON, in heraldry. See there, n° 23, 24.

CHEWING-BALLS, a kind of balls made of asafetida, liver of antimony, bay-wood, juniper-wood, and pelltury of Spain; which being dried in the sun, and wrapped in a linen cloth, are tied to the bit of the bridle for the horse to chew: they create an appetite; and it is said, that balls of Venice-treacle may be used in the same manner with good success.

CHEYKS. See BENGAL, n° 6.

CHEYNE (Dr George), a physician of great learning and abilities, born in Scotland in 1671, and educated at Edinburgh under the great Dr Pricairn. He passed his youth in close study, and with great temperance: but coming to settle at London, when about 30, and finding the younger gentry and free-livers to be the most easy of access and most susceptible of friendship, he changed on a sudden his former manner of living in order to force a trade, having observed this method to succeed with some others. The consequence was, that he grew daily in bulk, and in intimacy with his gay acquaintance; swelling to such an enormous size, that he exceeded 32 stone weight; and he was forced to have the whole side of his chariot made open to receive him into it: he grew short-breathed, lethargic, nervous, and scorbutic; so that

his life became an intolerable burden. In this deplorable condition, after having tried all the power of medicine in vain, he resolved to try a milk and vegetable diet: the good effects of which quickly appeared. His size was reduced almost a third; and he recovered his strength, activity, and cheerfulness; with the perfect use of all his faculties. In short, by a regular adherence to this regimen, he lived to a mature period, dying at Bath in 1748, aged 77. He wrote several treatises that were well received; particularly, "an essay on Health and Long Life;" and "the English Malady, or a treatise of Nervous Diseases;" both the result of his own experience.

CHIABRERA (Gabriel), esteemed the Pindar of Italy, was born at Savona in 1552, and went to study at Rome. The Italian princes, and Urban VIII. gave him public marks of their esteem. He wrote a great number of poems; but his lyric verses are most admired. He died at Savona in 1638, aged 86.

CHIAN EARTH, in pharmacy, one of the medicinal earths of the ancients, the name of which is preserved in the catalogues of the materia medica, but of which nothing more than the name has been known for many ages in the shops.

It is a very dense and compact earth; and is sent hither in small flat pieces from the island of Chios, in which it is found in great plenty at this time. It stands recommended to us as an astringent. They tell us, it is the greatest of all colimetics; and that it gives a whiteness and smoothness to the skin, and prevents wrinkles, beyond any of the other substances that have been celebrated for the same purposes.

CHIAOUS, a word in the original Turkish, signifying "envoys," are officers to the number of five or six hundred in the grand signior's court, under the command of a *chiaous bashi*. They frequently meet in the grand vizier's palace, that they may be in readiness to execute his orders, and carry his dispatches into all the provinces of the empire. The *chiaous bashi* assists at the divan, and introduces those who have business there.

CHIAPA, the capital of a province of the same name in Mexico, situated about 300 miles east of Acapulco. W. Long. 98. o. N. Lat. 16. 30.

CHIAPA *el Real*, a town of North America, in Mexico, a province of the same name, with a bishop's see. Its principal trade consists in chocolate-nuts, cotton, and sugar. W. Long. 98. 35. N. Lat. 16. 20.

CHIAPAS *de los Indes*, a large and rich town of North America, in Mexico, and in a province of the same name. The governor and most of the inhabitants are originally Americans. W. Long. 98. 5. N. Lat. 15. 6.

CHIARI (Joseph), a celebrated Italian painter, was the disciple of Carlo Maratti; and adorned the churches and palaces of Rome with a great number of fine paintings. He died of an apoplexy in 1727, aged 73.

CHIARI, a town of Italy, in the province of Brescia, and territory of Venice, 7 miles west of Brescia, and 27 east of Milan. Here the Imperialists gained a victory over the French in 1701. E. Long. 18. 18. N. Lat. 45. 30.

CHIARO-SCURO. See CHIARO-*Oscurro*.

CHIAVENNA, a handsome, populous, and large town

Chiabrera
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Chiavenna.

Chief
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Chief.

town of Switzerland, in the country of the Grisons. It is a trading place, especially in wine and delicate fruits. The governor's palace, and the churches, are very magnificent, and the inhabitants are Roman Catholics. It is seated near the lake Como. E. Long. 9. 29. N. Lat. 46. 15.

CHIAUSI, among the Turks, officers employed in executing the vizirs, bashaws, and other great men: the orders for doing this, the grand signior sends them wrapped up in a black cloth; on the reception of which, they immediately perform their office.

CHICANE, or CHICANERY, in law, an abuse of judiciary proceeding, tending to delay the cause, to puzzle the judge, or impose upon the parties.

CHICANE, in the schools, is applied to vain sophisms, distinctions, and subtleties, which protract disputes, and obscure the truth.

CHICHESTER, the capital city of the county of Suffex, is surrounded with a wall, which has four gates, answering to the four cardinal points; from which run two streets, that cross one another in the middle and form a square, where the market is kept, and where there is a fine stone piazza built by bishop Read. The space between the west and south gates is taken up with the cathedral church and the bishop's palace. It has five parish-churches; and is seated on the little river Lavant, which washes it on all sides except the north. This city would have been in a much more flourishing condition if it had been built by the sea-side; however, the inhabitants have endeavoured to supply this defect in some measure by cutting a canal from the city down into the bay. The principal manufactures of the town are malt and needles. The market of Chichester is noted for fish, wheat, barley, malt, and oats: the finest lobsters in England are bred in the Lavant; and it is observable, that this river, unlike most others, is very low in winter, but in summer often overflows its banks. Chichester is a city and a county of itself; the government being vested in a mayor, recorder, aldermen, common-council without limitation, and four justices of the peace chosen out of the aldermen. It is a bishop's see, and sends two members to parliament. W. Long. 50. N. Lat. 50. 50.

CHICK, or CHICKEN, in zoology, denotes the young of the gallinaceous order of birds, especially the common hen. See PHASIANUS.

CHICKEN-Pox. See (Index subjoined to) MEDICINE.

CHICK-Weed, in botany. See ALSINE.

CHICKLING-PEA, in botany, a name given to the LATYRUS.

CHICUITOS, a province of South America, in the government of Santo-Cruz de la Sierra. The chief riches consist of honey and wax; and the original inhabitants are very voluptuous, yet very warlike. They maintained bloody wars with the Spaniards till 1690; since which, some of them have become Christians. It is bounded by la Plata on the N. E. and by Chili on the W.

CHIDLEY, or CHIMLEY, a market-town of Devonshire, situated in W. Long. 4. o. N. Lat. 51. o.

CHIEF, a term signifying the head or principal part of a thing or person. Thus we say, the chief of a

party, the chief of a family, &c. The word is formed of the French *chef*, "head;" of the Greek *κεφαλη*, *caput*, "head;" though Menage derives it from the Italian *capo*, formed of the Latin *caput*.

CHIEF, in heraldry, is that which takes up all the upper part of the escutcheon from side to side, and represents a man's head: see HERALDRY, n° 15.—In *chief*, imports something borne in the chief part or top of the escutcheon.

CHIEFTAIN, denotes the captain or chief of any class, family, or body of men. Thus the chieftains or chiefs of the Highland clans, were the principal noblemen or gentlemen of their respective clans. See CLANS.

CHIELEFA, a strong town of Turkey in Europe, in the Morea. It was taken by the Venetians in 1685; but after that the Turks retook it, with all the Morea. E. Long. 22. 21. N. Lat. 26. 50.

CHILBLAIN, (*pernio*), in medicine, a tumour affecting the feet and hands; accompanied with an inflammation, pains, and sometimes an ulcer or solution of continuity: in which case it takes the denomination of *chaps* on the hands, and of *kibes* on the heels. Chilblain is compounded of *chill* and *blain*; *q. d.* a blain or sore contracted by cold. *Pernio* is the Latin name adopted by physicians; and is derived by Vossius from *perna* "a gammon of bacon," on account of some resemblance. *Chap* alludes to *gape*, both in sound and appearance. *Kibes*, in Welsh *kibws*, may be derived from the German *kerben*, "to cut;" the skin, when broke, appearing like a cut.

Chilblains are occasioned by excessive cold stopping the motion of the blood in the capillary arteries. See the article PERNIO.

CHILD, a term of relation to *parent*. See PARENT and CHILDREN.

Bartholine, Paré, Licetus, and many other writers, give an account of a petrified child, which has seemed wholly incredible to some people. The child, however, which they describe, is still in being; and is kept as a great rarity in the king of Denmark's museum at Copenhagen. The woman who was big with this, lived at Sens in Champaign in the year 1582; it was cut out of her belly, and was universally supposed to have lain there about 20 years. That it is a real human fetus, and not artificial, is evident to the eyes of any observer; and the upper part of it, when examined, is found to be of a substance resembling the gypsum, or stone whereof they make the plaster of Paris: the lower part is much harder; the thighs and buttocks being a perfect stone of a reddish colour, and as hard as common quarry-stone: the grain and surface of this part appears exactly like that of the calculi, or stones taken out of human bladders; and the whole substance examined ever so nearly, and felt ever so carefully, appears to be absolute stone. It was carried from Sens to Paris, and there purchased by a goldsmith of Venice; and Frederic III. king of Denmark, purchased it of this man at Venice for a very large sum, and added it to his collection of rarities.

CHILD-Bed, } See MIDWIFERY.
CHILD-Birth. }

CHILD-Wit, a power to take a fine of a bond-woman

Chief
|
Child-wit.

man unlawfully gotten with child, that is, without consent of her lord. Every reputed father of a base child got within the manor of Writtle in Essex, pays to the lord a fine of 3*s.* 4*d.*; where, it seems, child-wit extends to free, as well as bond women.

CHILDERMAS'-DAY, or INNOCENTS'-Day, an anniversary held by the church of England on the 28th of December, in commemoration of the children of Bethlehem massacred by order of Herod.

CHILDREN, the plural of CHILD.

Mr Derham computes, that marriages, one with another, produce four children, not only in England, but in other parts also.

In the genealogical history of Tuscany, wrote by Gamarini, mention is made of a nobleman of Sienna, named Pichi, who of three wives had 150 children; and that, being sent ambassador to the pope and the emperor, he had 48 of his sons in his retinue. In a monument in the church-yard of St Innocent, at Paris, erected to a woman who died at 88 years of age, it is recorded, that she might have seen 288 children directly issued from her. This exceeds what Hake-well relates of Mrs Honeywood, a gentlewoman of Kent, born in the year 1527, and married at 16 to her only husband R. Honeywood, of Charing, Esq; and died in her 93^d year. She had 16 children of her own body; of which three died young, and a fourth had no issue: yet her *grandchildren*, in the second generation, amounted to 114; in the third, to 228; though in the fourth, they fell to 9. The whole number she might have seen in her life-time being 367. 16+114+228+9=367. So that she could say the same as the distich does of one of the Dalburg's family at Basil:

1 2 3 4
Mater ait natæ dic natæ filia nata,
 5 6

Ut moneat, natæ, plangere, liliam.

Management of CHILDREN. See INFANT.

Overlaying of CHILDREN, is a misfortune that frequently happens; to prevent which the Florentines have contrived an instrument called *arcuccio*. See ARCUCCIO.

CHILDREN ARE, in law, a man's issue begotten on his wife. As to *illegitimate children*, see BASTARD.

For the legal duties of parents to their children, see PARENT and BASTARD.

As to the duties of children to their parents, they arise from a principle of natural justice and retribution. For to those who gave us existence, we naturally owe subjection and obedience during our minority, and honour and reverence ever after: they who protected the weakness of our infancy, are intitled to our protection in the infirmity of their age; they who by sustenance and education have enabled their offspring to prosper, ought, in return, to be supported by that offspring, in case they stand in need of assistance. Upon this principle proceed all the duties of children to their parents, which are enjoined by positive laws. And the Athenian laws carried this principle into practice with a scrupulous kind of nicety: obliging all children to provide for their father when fallen into poverty; with an exception to spurious children, to those whose chastity had been prostituted

with consent of their father, and to those whom he had not put in any way of gaining a livelihood. The legislature, says baron Montesquieu, considered, that, in the first case, the father, being uncertain, had rendered the natural obligation precarious; that, in the second case, he had sullied the life he had given, and done his children the greatest of injuries, in depriving them of their reputation; and that, in the third case, he had rendered their life, (so far as in him lay), an insupportable burden, by furnishing them with no means of subsistence.

Our laws agree with those of Athens, with regard to the first only of these particulars, the case of spurious issue. In the other cases, the law does not hold the tie of nature to be dissolved by any misbehaviour of the parent; and therefore a child is equally justifiable in defending the person, or maintaining the cause or suit, of a bad parent, as of a good one; and is equally compellable, if of sufficient ability, to maintain and provide for a wicked and unnatural progenitor, as for one who has shewn the greatest tenderness and parental piety.

CHILI, a province of South America, bounded by Peru on the north, by the province of La Plata on the east, by Patagonia on the south, and by the Pacific ocean on the west, lying between 75 and 85 degrees of west longitude, and between 25 and 45 degrees of south latitude; though some comprehend in this province, Patagonia and Terra del Fuego.

The first attempt of the Spaniards upon this country was made by Almagro in the year 1535, after he and Pizarro had completed the conquest of Peru. He set out on his expedition to Chili with a considerable body of Spaniards and auxiliary Indians. For 200 leagues, he was well accommodated with every necessary by the Indians, who had been subjects of the emperors of Peru: but reaching the barren country of Charcas, his troops became discontented through the hardships they suffered; which determined Almagro to climb the mountains called Cordilleras, in order to get the sooner into Chili; being ignorant of the invaluable mines of Potosi, contained in the province of Charcas where he then was. At that time the Cordilleras were covered with snow, the depth of which obliged him to dig his way through it. The cold made such an impression on his naked Indians, that it is computed no less than 10,000 of them perished on these dreadful mountains, 150 of the Spaniards sharing the same fate; while many of the survivors lost their fingers and toes through the excess of cold. At last, after encountering incredible difficulties, Almagro reached a fine, temperate, and fertile plain on the opposite side of the Cordilleras, where he was received with the greatest kindness by the natives. These poor savages, taking the Spaniards for deputies of their god Virachoca, immediately collected for them an offering of gold and silver worth 200,000 ducats: and soon after brought a present to Almagro worth 300,000 more. These offerings only determined him to conquer the whole country as soon as possible. The Indians among whom he now was, had acknowledged the authority of the Peruvian incas, or emperors, and consequently gave Almagro no trouble. He therefore marched immediately against those who had never been

been conquered by the Peruvians, and inhabited the southern parts of Chili. These savages fought with great resolution, and disputed every inch of ground : but in five months time the Spaniards had made such progress, that they must infallibly have reduced the whole province in a very little time, had not Almagro returned to Peru, in consequence of a commission sent him from Spain.

In 1540, Pizarro having overcome and put Almagro to death, sent into Chili, *Baldivia*, or *Valdivia*, who had learned the rudiments of war in Italy, and was reckoned one of the best officers in the Spanish service. As he penetrated southwards, however, he met with much opposition : the confederated caziques frequently gave him battle, and displayed great courage and resolution ; but could not prevent him from penetrating to the valley of *Mafisco*, which he found incredibly fertile and populous. Here he founded the city of St Jago ; and finding gold mines in the neighbourhood, forced the Indians to work in them ; at the same time building a castle for the safety and protection of his new colony. The natives, exasperated at this slavery, immediately took up arms ; attacked the fort ; and, though defeated and repulsed, set fire to the outworks, which contained all the provisions of the Spaniards. Nor were they discouraged by this and many other defeats, but still continued to carry on the war with vigour. At last, Valdivia, having overcome them in many battles, forced the inhabitants of the vale to submit ; upon which he immediately let them to work in the mines of Quilotes. This indignity offered to their countrymen redoubled the fury of those who remained at liberty. Their utmost efforts, however, were as yet unable to stop Valdivia's progress. Having crossed the large rivers Maule and Hata, he travelled a vast tract of country, and founded the city of *La Concepcion* on the South-sea-coast. He erected fortresses in several parts of the country, in order to keep the natives in awe ; and built the city called *Imperial*, about 40 leagues to the southward of Concepcion. The Spanish writers say, that the neighbouring valley contained 80,000 inhabitants of a peaceable disposition ; and who were even so tame as to suffer Valdivia to parcel out their lands among his followers, while they themselves remained in a state of inactivity. About 16 leagues to the eastward of *Imperial*, the Spanish general laid the foundations of the city *Villa Rica*, so called on account of the rich gold mines he found there. But his ambition and avarice had now involved himself in difficulties from which he could never be extricated : He had extended his conquests beyond what his strength was capable of maintaining. The Chileans were still as desirous as ever of recovering their liberties. The horses, fire-arms, and armour of the Spaniards, indeed, appeared dreadful to them ; but the thoughts of endless slavery were still more so. In the course of the war they had discovered that the Spaniards were vulnerable and mortal men like themselves ; they hoped, therefore, by dint of their superiority in numbers, to be able to expel the tyrannical usurpers. Had all the nations joined in this resolution, the Spaniards had certainly been exterminated ; but some of them were of a pacific and fearful disposition, while others considered servitude as the greatest of all possible calamities.

Of this last opinion were the *Araceans*, the most intrepid people in Chili, and who had given Valdivia the greatest trouble. They all rose to a man, and chose *Capaulcan*, a renowned hero among them, for their leader. Valdivia, however, received notice of their revolt sooner than they intended he should, and returned with all expedition to the vale of Aracea ; but before he arrived, 14,000 of the Chileans were there assembled under the conduct of Capaulcan. He attacked them with his cavalry, and forced them to retreat into the woods ; but could not obtain a complete victory, as they kept continually falling out and harassing his men. At last Capaulcan, having observed that fighting with such a number of undisciplined troops only served to contribute to the defeat and confusion of the whole, divided his forces into bodies of 1000 each. These he directed to attack the enemy by turns ; and, though he did not expect that a single thousand would put them to flight, he directed them to make as long a stand as they could ; when they were to be relieved and supported by another body ; and thus the Spaniards would be at last wearied out and overcome. The event fully answered his expectations. The Chileans maintained a fight for seven or eight hours, until the Spaniards, growing faint for want of refreshment, retired precipitately. Valdivia ordered them to possess a pass at some distance from the field, to stop the pursuit ; but this design being discovered to the Chilkians by the treachery of his page, who was a native of that country, the Spaniards were surrounded on all sides, and cut in pieces by the Indians. The general was taken and put to death ; some say with the tortures usually inflicted by those savages on their prisoners* ; others, that he had melted gold poured down his throat ; but all agree, that the Indians made flutes and other instruments of his bones, and preserved his skull as a monument of their victory, which they celebrated by an annual festival. After this victory the Chileans had another engagement with their enemies ; in which also they proved victorious, defeating the Spaniards with the loss of near 3000 men ; and upon this they bent their whole force against the colonies. The city of Concepcion, being abandoned by the Spaniards, was taken and destroyed ; but the Indians were forced to raise the siege of *Imperial* ; and their progress was at last stopped by Garcia de Mendoza, who defeated Capaulcan, took him prisoner, and put him to death. No defeats, however, could dispirit the Chileans. They continued the war for 50 years ; and to this day they remain unconquered, and give the Spaniards more trouble than any other American nation. Their most irreconcilable enemies are the inhabitants of Aracea and Tucapel, those to the south of the river Bobio, or whose country extends towards the Cordilleras.—The manners of these people greatly resemble those of North America, which we have already described under the article AMERICA ; but seem to have a more warlike disposition. It is a constant rule with the Chileans never to sue for peace. The Spaniards are obliged not only to make the first overtures, but to purchase it by presents. They have at last been obliged to abandon all thoughts of extending their conquests, and reduced to cover their frontiers by erecting forts at proper distances.

* See America, n^o 35.

Chili.

The Spanish colonies in Chili are dispersed on the borders of the South-sea. They are parted from Peru by a desert 80 leagues in breadth; and bounded by the island of Chiloe, at the extremity next the straits of Magellan. There are no settlements on the coast except those of Baldivia, Concepcion-island, Valparaíso, and Coquimbo or La Serena, which are all sea-ports. In the inland country is St Jago, the capital of the colony. There is no culture nor habitation at any distance from these towns. The buildings in the whole province are low, made of unburnt brick, and mostly thatched. This practice is observed on account of the frequent earthquakes; and is properly adapted to the nature of the climate, as well as the indolence of the inhabitants.

The climate of Chili is one of the most wholesome in the whole world. The vicinity of the Cordilleras gives it such a delightful temperature as could not otherwise be expected in that latitude. Though gold mines are found in it, their richness has been too much extolled; their produce never exceeds L. 218,750. The soil is prodigiously fertile. All the European fruits have improved in that happy climate. The wine would be excellent if nature were properly assisted by art: and the corn-harvest is reckoned a bad one when it does not yield a hundred fold. With all these advantages, Chili has no direct intercourse with the mother-country. Their trade is confined to Peru, Paraguay, and the savages on their frontiers. With these last they exchange their less valuable commodities, for oxen, horses, and their own children, whom they are ready to part with for the most trifling things. This province supplies Peru with great plenty of hides, dried fruit, copper, salt-meat, horses, hemp, lard, wheat, and gold. In exchange it receives tobacco, sugar, cocoa, earthen-ware, woollen-cloth, linen, hats made at Quito, and every article of luxury brought from Europe. The ships sent from Callao on this traffic were formerly bound to Concepcion Bay, but now come to Valparaíso. The commerce between this province and Paraguay is carried on by land, though it is a journey of 300 leagues, 40 of which lie through the snows and precipices of Cordilleras; but if it was carried on by sea, they must either pass the straits of Magellan, or double Cape Horn, which the Spaniards always avoid as much as possible. To Paraguay are sent some woollen stuffs called *ponchos*, which are used for cloaks; also wines, brandy, oil, and chiefly gold. In return they receive wax, a kind of tallow fit to make soap, European goods, and negroes.

Chili is governed by a chief, who is absolute in all civil, political, and military affairs, and is also independent of the viceroy. The latter has no authority except when a governor dies; in which case he may appoint one in his room for a time, till the mother-country names a successor. If, on some occasions, the viceroy has interfered in the government of Chili, it was when he has been either authorized by a particular trust reposed in him by the court, or by the deference paid to the eminence of his office; or when he has been actuated by his own ambition to extend his authority. In the whole province of Chili there are not 20,000 white men, and not more than 60,000 ne-

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grees, or Indians, able to bear arms. The military establishment amounted formerly to 2000 men; but the maintaining of them being found too expensive, they were reduced to 500 at the beginning of this century.

CHILIAD, an assemblage of several things ranged by thousands. The word is formed of the Greek *χίλιας*, *millē*, a thousand.

CHILIARCHA, or CHILIARCHUS, an officer in the armies of the ancients, who had the command of a thousand men.

CHILIAGON, in geometry, a regular plain figure of 100 sides and angles. Though the imagination cannot form the idea of such a figure, yet we may have a very clear notion of it in the mind, and can easily demonstrate that the sum of all its angles is equal to 1996 right ones: for the internal angles of every plane figure are equal to twice as many right ones as the figure hath sides, except those four which are about the centre of the figure, from whence it may be resolved into as many triangles as it has sides. The author of *L'art de Penfer*, p. 44. has brought this instance to shew the distinction between imagination and conceiving.

CHILIASTS, in church-history See MILLENA-RIANS.

CHILLINGWORTH (William), an eminent divine of the church of England, was born at Oxford in 1602, and bred there. He made early great proficiency in his studies, being of a very quick genius. He was an expert mathematician, as well as an able divine, and a very good poet. Study and conversation at the university turning upon the controversy between the church of England and that of Rome, on account of the king's marriage with Henrietta daughter to Henry IV. king of France, Mr Chillingworth forsook the church of England, and embraced the Romish religion. Dr Laud, then bishop of London, hearing of this, and being greatly concerned at it, wrote Mr Chillingworth; who expressing a great deal of candour and impartiality, that prelate continued to correspond with him. This set Mr Chillingworth on a new inquiry; and at last determined him to return to his former religion. In 1634 he wrote a confutation of the arguments which had induced him to go over to the church of Rome. He spoke freely to his friends of all the difficulties that occurred to him; which gave occasion to a groundless report, that he had turned Papist a second time, and then Protestant again. His return to the communion of the church of England made a great noise, and engaged him in several disputes with those of the Romish persuasion. But in 1635 he engaged in a work which gave him a far greater opportunity to confute the principles of the church of Rome, and to vindicate the Protestant religion, under the title of "The Religion of Protestants a safe Way to Salvation." Sir Thomas Coventry, lord keeper of the great seal, offering him preferment, Mr Chillingworth refused to accept it on account of his scruples with regard to the subscription of the 39 articles. However he at last surmounted these scruples; and being promoted to the chancellorship of the church of Sarum, with the prebend of Brixworth in Northamptonshire annexed to it, he com-

Chiliad
Chillingworth.

Chilminar
|
Chimes.

plied with the usual subscription. Mr Chillingworth was zealously attached to the royal party; and, in August 1643, was present in king Charles I.'s army at the siege of Gloucester, where he advised and directed the making certain engines for assaulting the town. Soon after, having accompanied the Lord Hopton, general of the king's forces in the west, to Arundel castle in Sussex, he was there taken prisoner by the parliamentary forces under the command of Sir William Waller, who obliged the castle to surrender. But his illness increasing, he obtained leave to be conveyed to Chichester, where he was lodged at the bishop's palace; and, after a short sickness, died in 1644. He hath left several excellent works behind him.

CHILMINAR. See PERSEPOLIS.

CHILO, one of the seven Æges of Greece, and of the ephori of Sparta the place of his birth, flourished about 556 years before Christ. He was accustomed to say, that there were three things very difficult: "To keep a secret; to know how best to employ our time; and to suffer injuries without murmuring." According to Pliny, it was he who caused the short sentence, *Know thyself*, to be written in letters of gold in the temple of Delphos. It is said that he died with joy, while embracing his son, who had been crowned at the Olympic games.

CHILOE, an island lying near the coast of Chili, in South America, under the 43^d degree of south latitude. It is the chief of an archipelago of 40 islands, and its principal town is Cañiro. It rains here almost all the year, inasmuch that nothing but Indian corn, or some such grain, that requires but little heat to ripen it, can ever come to perfection. They have excellent shell-fish, very good wild-fowl, hogs, sheep, and beeves. As also a great deal of honey and wax. They carry on a trade with Peru and Chili; whither they send boards of cedar, of which they have vast forests.

CHILTERN, a chain of chalky hills, running from east to west through Buckinghamshire.

CHIMÆRA, a port-town of Turkey in Europe, situated at the entrance of the gulph of Venice, in the province of Epirus, about 32 miles north of the city Corfu, near which are the mountains of Chimæra, which divide Epirus from Thessaly. E. Long. 20. 40. N. Lat. 40. 20.

CHIMÆRA, a fabulous monster, which the poets feign to have the head of a lion, the body of a goat, and the tail of a dragon; and add, that this odd beast was killed by Bellerophon. According to authors, the foundation of the fable was, that in Lycia there was a burning mountain or volcano of this name; that the top of this mountain was seldom without lions, nor the middle, which had very good grass, without goats; that serpents bred at the bottom, which was marshy; and that Bellerophon rendered the mountain habitable.

By a *chimera*, among the philosophers, is understood a mere creature of the imagination, composed of such contradictions and absurdities as cannot possibly any where exist but in thought.

CHIMES of a CLOCK, a kind of periodical music, produced at equal intervals of time, by means of a particular apparatus added to a clock.

In order to calculate numbers for the chimes, and adapt the chime-barrel, it must be observed, that the barrel must turn round in the same time that the tune it is to play requires in singing. As for the chime-barrel, it may be made up of certain bars that run athwart it, with a convenient number of holes punched in them to put in the pins that are to draw each hammer: and these pins, in order to play the time of the tune rightly, must stand upright, or hang down from the bar, some more, some less. To place the pins rightly, you may proceed by the way of changes on bells, viz. 1, 2, 3, 4; or rather make use of the musical notes. Observe what is the compass of your tune, and divide the barrel accordingly from end to end.

Thus in the examples on Plate LXXIX. fig. 1, 2, each of the tunes are eight notes in compass; and accordingly, the barrel is divided into eight parts. These divisions are struck round the barrel; opposite to which are the hammer-tails.

We speak here as if there were only one hammer to each bell, that it may be more clearly apprehended; but when two notes of the same found come together in a tune, there must be two hammers to the bell to strike it: so that if, in all the tunes you intend to chime of eight notes compass, there should happen to be such double notes on every bell; instead of eight, you must have sixteen hammers; and accordingly you must divide the barrel, and strike sixteen strokes round it, opposite to each hammer-tail: then you are to divide it round about, into as many divisions as there are musical bars, semibreves, minims, &c. in the tune.

Thus the hundredth-psalm tune has 20 semibreves, and each division of it is a semibreve: the first note of it also is a semibreve; and, therefore, on the chime-barrel must be a whole division, from five to five; as you may understand plainly, if you conceive the surface of a chime-barrel to be represented by the above figures, as if the cylindrical superficies of the barrel were stretched out at length, or extended on a plane: and then such a table, so divided, if it were to be wrapped round the barrel, would shew the places where all the pins are to stand in the barrel: for the dots running about the table, are the places of the pins that play the tune.

Indeed, if the chimes are to be complete, you ought to have a set of bells to the gamut notes; so as that, each bell having the true found of *sol, la, mi, fa*, you may play any tune with its flats and sharps: nay, you may by this means play both the bass and treble with one barrel: and by letting the names of your bells at the head of any tune, that tune may easily be transferred to the chime-barrel, without any skill in music: but it must be observed, that each line in the music is three notes distant; that is, there is a note between each line, as well as upon it.

CHIMNEY, in architecture, a particular part of a house, where the fire is made, having a tube or funnel to carry off the smoke.

Method of Building CHIMNEYS that will not smoke.

—Workmen have different methods of drawing up the funnels of chimneys, generally according to their own fancies and judgments, and sometimes according to the customs

Chimes.
|
Chimney.

Chimney
China.

clustoms of places. They are seldom directed by sound and rational principles. It will be found for the most part, that the smoking of chimneys is owing to their being carried up narrower near the top than below, or, zig-zag, all in angles: in some cases, indeed, it is owing to accidental causes; but, for the most part, to those two above mentioned. Where they are carried up in the pyramid or tapering form, especially if the house be of a considerable height, it is ten to one but they sometimes smoke. The air in the rooms, being rarefied, is forced into the funnel of the chimney, and receives from the fire an additional force to carry up the smoke. Now it is evident, that the further up the smoke flies, the less is the force that drives it, the slower it must move, and consequently the more room in proportion it should have to move in; whereas in the usual way it has less, by the sides of the chimney being gathered closer and closer together.

The method here proposed of carrying up chimneys will be objected to by some thus: The wider a chimney is at the top, say they, the more liberty has the wind to blow down. Very true; but is it not resisted in going down, both by the form of the chimney and other evident causes, so that it must return again? In the other way, when the wind blows down, the resistance being less, the wind and smoke are, if we may use the expression, imprisoned, and make the smoke puff out below. This method has proved effectual after all others had failed; and that in a house placed in the worst situation possible, namely, under a high mountain to the southward, from which strong blasts blow down upon it. A vent was carried up without angles, as perpendicular as possible; and was made about three or four inches wider at top than at the bottom: the funnel was gathered in a throat directly above the fire-place, and so widening upwards. Since that time the house has not only ceased to smoke, but, when the doors stand open, the draught is so strong that it will carry a piece of paper out at the chimney-head. See more on this subject under the article SMOKE.

CHIMNEY-Money, otherwise called *Hearth-money*, a duty to the crown on houses. By stat. 14. Char. II. cap. 2. every fire-hearth, and stove of every dwelling or other house, within England and Wales (except such as pay not to church and poor), was chargeable with 2 s. per annum, payable at Michaelmas and Lady-day to the king and his heirs and successors, &c.; which payment was commonly called *chimney-money*. This tax, being much complained of as burthenome to the people, has been since taken off, and others imposed in its stead; among which that on windows has by some been esteemed almost equally grievous.

CHIMPANZEE, in natural history. See SIMIA.

Boundaries,
extent, &c.

CHINA, a country of Asia, situated on the most easterly part of that continent. It is bounded on the north by Tartary; from which it is divided, partly by a prodigious wall of 1500 miles in length, and partly by high, craggy, and inaccessible mountains. On the east, it is bounded by the ocean; on the west, by part of the Mogul's empire, and India beyond the Ganges, from which it is parted by other ridges of high moun-

tains and sandy deserts. On the south, it is bounded partly by the kingdoms of Lao, Tonquin, Ava, and Cochin-China, and partly by the southern or Indian sea, which flows between it and the Philippine islands. There are several ways of computing its length and breadth. According to some of these, it is reckoned 1269, 1600, or 1800 miles in length and as much in breadth: however, by the best and latest accounts, this vast country is somewhat of an oval form, the breadth being less than the length, by little more than a fourth-part. It contains 15 provinces, exclusive of that of *Lyau-tong*, which is situated without the great wall, though under the same dominion. Their names are, 1. Shenfi; 2. Shanfi; 3. Pecheli: which are situated on the north side, along the wall. 4. Shan-tong; 5. Kyan-nang; 6. Che-kyang; 7. Fo-kyen: which are situated along the eastern ocean. 8. Quang-tong; 9. Quang-li; 10. Yu-nan; 11. Se-chen: which stretch themselves towards the south and south-west. And, 12. Ho-nan; 13. Hu-quang; 14. Quey-chew; 15. Kyang-fi: which take up the middle part. For a particular description of all these, see their proper articles.

The origin of all nations is involved in obscurity and fable; but that of the Chinese much more so than any other. Every nation is inclined to assume too high an antiquity to itself, but the Chinese carry theirs beyond all bounds. Indeed, though no people on earth are more exact in keeping records of every memorable transaction, yet such is the genius of the Chinese for superstition and fable, that the first part of their history is deservedly condemned by every rational person. What contributes more to the uncertainty of the Chinese history is, that neither we, nor they themselves, have any thing but fragments of their ancient historical books; for about 213 years before Christ, the reigning emperor *Si-whang-ti* caused all the books in the empire to be burned, except those written by lawyers and physicians. Nay, the more effectually to destroy the memory of every thing contained in them, he commanded a great number of learned men to be buried alive, lest, from their memories, they should commit to writing something of the true memoirs of the empire. The inaccuracy of the Chinese annals is complained of even by their most respected author, Confucius himself; who also affirms, that, before his time, many of the oldest materials for writing such annals had been destroyed.

According to the Chinese historians, the first monarch of the whole universe, (that is, of China), was called *Poon-ku*, or *Puen-cu*. This, according to some, was the first man; but according to Bayer and Menzelius, two of the greatest critics in Chinese literature that have hitherto appeared, the word signifies the highest antiquity. *Poon-ku* was succeeded by *Tienc-hoang*, which signifies the emperor of heaven. They call him also the intelligent heaven, the supreme king of the middle heaven, &c. According to some of their historians, he was the inventor of letters, and of the Cyclic characters by which they determine the place of the year, &c. *Tienc-hoang* was succeeded by *Ti-hoang*, (the emperor of the earth), who divided the day and night, appointing 30 days to make one moon, and fixed the winter solstice to the 11th

China.

2
Division
into pro-
vinces.

3
Chinese
pretensions
to antiquity

4
Why their
history is so
uncertain

5
Fables
of history of
China

China.

moon. Ti-hoang was succeeded by Gine-hoang, (sovereign of men), who with his nine brothers shared the government among them. They built cities, and surrounded them with walls; made a distinction between the sovereign and subjects; instituted marriage, &c.

The reigns of these four emperors make up one of what the Chinese called *ki*, "ages," or "periods," of which there were nine before Fo-hi, whom their most sensible people acknowledge as the founder of their empire.

The history of the second *ki*, contradicts almost every thing said of the first; for though we have but just now been told that Gine-hoang and his brethren built cities surrounded with walls; yet, in the succeeding age, the people dwelt in caves, or perched upon trees as it were in nests. Of the third *ki* we hear nothing; and in the fourth, it seems matters had been still worse, as we are told that men were then only taught to retire into the hollows of rocks. Of the fifth and sixth we have no accounts. These six periods, according to some writers contained 90,000 years; according to others, 1,100,750.

In the seventh and eighth *ki*, they tell us over again what they had said of the first; namely, that men began to leave their caves and dwell in houses, and were taught to prepare clothes, &c. Tchine-kiang, the first monarch of the eighth *ki*, taught his subjects to take off the hair from skins with rollers of wood, and cover themselves with the skins so prepared. He taught them also to make a kind of web of their hair, to serve as a covering to their heads against rain. They obeyed his orders with joy, and he called his subjects *people clothed with skins*. His reign lasted 350 years; that of one of his successors, also, named Yeou-tiao-chi, lasted more than 300; and his family continued for 12 or 18,000 years. But what is very surprising, all these thousands and millions of years had elapsed without mankind having any knowledge of fire. This was not discovered till towards the close of this period, by one Souigine. After so useful a discovery, he taught the people to dress their vituals; whereas before, they had devoured the flesh of animals quite raw, drank their blood, and swallowed even their hair and feathers. He is also said to have been the inventor of fishing, letters, &c.

In the ninth period we find the invention, or at least the origin, of letters, attributed to one T'ang-hie, who received them from a divine tortoise that carried them on his shell, and delivered them into the hands of T'ang-hie. During this period also, music, money, carriages, merchandize and commerce, &c. were invented. There are various calculations of the length of these *ki* or periods. Some make the time from Puan-ku to Confucius, who flourished about 479 years before Christ, to contain 276,000 years; others, 2,276,000; some, 2,759,860 years; others, 3,276,000; and some no less than 96,961,740 years.

These extravagant accounts are by some thought to contain obscure and imperfect hints concerning the cosmogony, and creation of the world, &c. Puan-ku, the first emperor, they think represents eternity preceding the duration of the world. The succeeding ones, Tiene-hoang, Ti-hoang, and Gine-hoang, they

imagine, signify the creation of the heavens and earth, and the formation of man. The ten *ki*, or ages, nine of which preceded Fo-hi, mean the ten generations preceding Noah. This may very possibly be the case; for about 300 years before Christ, some Jews travelled into China, who might have made the Mosaic writings known there.

What we have now related, contains the substance of that part of the Chinese history which is entirely fabulous. After the nine *ki* or "ages" already taken notice of, the tenth commenced with Fo-hi; and the history, though still very dark, obscure, and fabulous, begins to grow somewhat more consistent and intelligible. Fo-hi was born in the province of Shenfi. His mother walking upon the bank of a lake in that province, saw a very large print of a man's foot in the sand there; and, being surrounded by an iris or rainbow, became impregnated. The child was named *Fo-hi*; and, when he grew up, was by his countrymen elected king on account of his superior merit, and styled *T'ient-tse*, that is "the son of heaven." He invented the eight *qua*, or symbols, consisting of three lines each, which, differently combined, formed 64 characters that were made use of to express every thing. To give these the greater credit, he pretended that he had seen them inscribed on the back of a dragon-horse, (an animal shaped like a horse, with the wings and scales of a dragon), which arose from the bottom of a lake. Having gained great reputation among his countrymen for this prodigy, he is said to have created mandarins or officers, under the name of *dragons*. Hence we may assign a reason why the emperors of China always carry a dragon in their banners. He also instituted marriage, invented music, &c. Having established a prime minister, he divided the government of his dominions among four mandarins, and died after a reign of 115 years.

After Fo-hi followed a succession of emperors, of whom nothing remarkable is recorded, except that in the reign of *Tau*, the seventh after Fo-hi, the sun did not set for 10 days, so that the Chinese were afraid of a general conflagration. This event the compilers of the Universal history take to be the same with that mentioned in the book of Joshua, when the sun and moon stood still for about the space of a day. Fo-hi, they will have to be the same with Noah. They imagine, that after the deluge, this patriarch remained some time with his descendants; but on their wicked combination to build the tower of Babel, he separated himself from them with as many as he could persuade to go along with him; and that, still travelling eastward, he at last entered the fertile country of China, and laid the foundation of that vast empire.—But, leaving these fabulous and conjectural times, we shall proceed to give some account of that part of the Chinese history, which may be more certainly depended on.

As the Chinese, contrary to the practice of almost all nations, have never sought to conquer other countries, but rather to improve and content themselves with their own, their history for many ages furnishes nothing remarkable. The whole of their emperors, abstracting from those who are said to have reigned in the fabulous times, are comprehended

China.

Reign of
Fo-hi.

8

Miraculous
solstice.

9

Hypothesis
concerning
this solstice
and Fo-hi.

6
Fabulous
history ex-
plained.

China. ed in 22 dynasties, mentioned in the following table:

	Emperors.	Before Christ.
1. <i>Hya</i> , containing	17	2207.
2. <i>Shang</i> , or <i>Iug</i> ,	28	1766.
3. <i>Chew</i> ,	35	1122.
4. <i>Tsin</i> ,	4	248.
5. <i>Han</i> ,	25	206.
		After Christ.
6. <i>Hew-han</i> ,	2	220.
7. <i>Tsin</i> ,	15	265.
8. <i>Song</i> ,	8	420.
9. <i>Tsi</i> ,	5	479.
10. <i>Lyang</i> ,	4	502.
11. <i>Chin</i> ,	4	557.
12. <i>Sui</i> ,	3	
13. <i>Twang</i> ,	20	618.
14. <i>Hew-lyang</i> ,	2	907.
15. <i>Hew-lang</i> ,	4	923.
16. <i>Hew-tsin</i> ,	2	936.
17. <i>Hew-han</i> ,	2	947.
18. <i>Hew-chew</i> ,	3	951.
19. <i>Song</i> ,	9	960.
20. <i>Iwen</i> ,	8	1280.
21. <i>Ming</i> ,	16	1368.
22. <i>Tsing</i> ,		1645.

This table is formed according to the accounts of the Jesuit Du Halde, and is commonly reckoned to be the most authentic; but according to the above mentioned hypothesis of the compilers of the Universal History, who make *Yau* cotemporary with Joshua, the dynasty of *Hya* did not commence till the year before Christ 1357; and to accommodate the history to their hypothesis, great alterations must be made in the duration of the dynasties.

The most interesting particulars of the Chinese history relate only to the incursions of the Tartars, who at last conquered the whole empire, and who still continue to hold the sovereignty; though by transferring the seat of the empire to Peking, and adopting the Chinese language, manners, &c. Tartary would seem rather to have been conquered by China, than China by Tartary. These incursions are said to have begun very early; even in the time of the emperor *Shun*, successor to *Yau* above mentioned, in whose reign the miraculous solstice happened. At this time, however, the Tartars were repulsed, and obliged to retire into their own territories. From time to time, however, they continued to threaten the empire with invasions, and the northern provinces were often actually ravaged by the Tartars in the neighbourhood. About the year before Christ 213, *Shi-whang-ti*, having fully subdued all the princes, or *kingi*, as they were called, of the different provinces, became emperor of China with unlimited power. He divided the whole empire into 36 provinces; and finding the northern part of his dominions much incommoded by the invasions of the neighbouring barbarians, he sent a formidable army against them which drove them far beyond the boundaries of China. To prevent their return, he built the famous wall already mentioned, which separates China from Tartary. After this, being elated with his own exploits, he formed a

design of making posterity believe that he himself had been the first Chinese emperor that ever sat on the throne. For this purpose, he ordered all the historical writings to be burnt, and caused many of the learned to be put to death, as already mentioned.

What effect the great wall for some time had in preventing the invasions of the Tartars, we are not told; but in the tenth century of the Christian era, those of *Kitan* or *Lyau* got a footing in China. The *Kitan* were a people of Eastern Tartary, who dwelt to the north and north-east of the province of *Pecheli* in China, particularly in that of *Layu-tong* lying without the great wall. These people having subdued the country between *Korea* and *Kalgai*, became much more troublesome to the Chinese than all the other Tartars. Their empire commenced about the year 916, in the fourth year of *Mo-ti-kyun-ti*, second emperor of the 14th Chinese dynasty called *Hew-lyang*. In 946, *Ming-ti*, second emperor of the 15th dynasty, being dead, *Sheking-tang*, his son-in-law, rebelled against *Ming-ti*, his son and successor, whom he deprived of his crown and life. This he accomplished by means of an army of 50,000 men furnished by the *Kitan*. *Fi-ti*, the son of *Ming-ti*, being unable to resist the usurper, fled to the city *Ghey-chew*; where shutting himself up with his family and all his valuable effects, he set fire to the palace and was burnt to ashes. On his death, *Sheking-tang* assumed the title of emperor; founded the 16th dynasty; and changed his name to that of *Kaut-su*. But the *Kitan* general refusing to acknowledge him, he was obliged to purchase a peace by yielding up to the Tartars 16 cities in the province of *Pecheli*, besides a yearly present of 300,000 pieces of silk.

This submission served only to enflame the avarice and ambition of the *Kitan*. In 959, they broke the treaty when least expected, and invaded the empire afresh. *Tsi-vang*, the emperor at that time, opposed them with a formidable army; but through the treachery of his general *Lyew-chi-ywen*, the Tartars were allowed to take him prisoner. On this, *Tsi-vang* was glad to recover his liberty by accepting of a small principality; while the traitor became emperor of all China, and changing his name to *Kaut-su*, founded the 17th dynasty. The Tartars, in the mean time, ravaged all the northern provinces without opposition, and then marched into the southern. But being here stopped by some bodies of Chinese troops, the general thought proper to retire with his booty into Tartary. In 962, *Kaut-li*, dying, was succeeded by his son *Li-ti*. The youth of this prince gave an opportunity to the eunuchs to raise commotions; especially as the army was employed at a distance in repelling the invasions of the Tartars. This army was commanded by *Ko-ghey*, who defeated the enemy in several battles, and thus restored peace to the northern provinces. In the mean time, *Li-ti* was slain by his eunuchs, and the empress placed his brother on the throne: but *Ko-ghey*, returning in triumph, was saluted emperor by his victorious army, and the empress being unable to support the rights of her son, was obliged to submit, while *Ko-ghey*, assuming the name of *Yay-tsu*, founded the 18th dynasty. Nine years after

China.

12
Kitan Tar-
tars settle
in China.

10
Incursions
of the Tar-
tars.

21
Great wall
built.

China.

after this, however, the grandees of the empire, setting aside Kong-ti, the third in succession from Tay-tsu, on account of his non-age, proclaimed his guardian, named *Chau-quang-yu*, emperor; who, assuming the name of Kau-tsu, founded the 19th dynasty, called *Song*, or *Tsong*.

Under this monarch the empire began to recover itself; but the Kitan still continued their incursions. The successors of Kau-tsu opposed them with various success; but at last, in 978, the barbarians became so strong as to lay siege to a considerable city. Tay-tsong, successor to Kau-tsu, detached 200 soldiers, each carrying a light in his hand, against them in the night-time, with orders to approach as near as possible to the Tartar camp. The barbarians, imagining, by the number of lights, that the whole Chinese army was at hand, immediately fled, and, falling into the ambuscades laid for them by the Chinese general, were almost all cut to pieces.

This check, however, did not long put a stop to the ravages of the Kitan. In the year 999, they laid siege to a city in the province of Pecheli; but Ching-tsong, successor to Tay-tsong, came upon them with his army so suddenly, that they took themselves to flight. The emperor was advised to take advantage of their consternation, and recover the country which had been yielded to them; but instead of pursuing his victory, he bought a peace, by consenting to pay annually 100,000 taels (about L. 34,000), and 200,000 pieces of silk. The youth and pacific disposition of Jin-tsong, successor to Ching-tsong, revived the courage of the Kitan; and, in 1035, war would have been renewed, had not the emperor condescended to as shameful a treaty as that concluded by his father. Two years after, the Tartars demanded restitution of ten cities in the province of Pecheli, which had been taken by Ko-giely founder of the 18th dynasty; upon which Jin-tsong engaged to pay them an annual tribute of 200,000 taels of silvers, and 300,000 pieces of silk in lieu of these cities.

From this time, the Kitan remained in peaceable possession of their Chinese dominions till the year 1117. Whey-tsong, at that time emperor, being able neither to bear their ravages, nor by himself to put a stop to them, resolved upon a remedy which at last proved worse than the disease. This was to call in the Nu-che, Nyu-che, or Eastern Tartars, to destroy the kingdom of the Kitan. From this he was dissuaded by the king of Korea, and most of his own ministers; but, disregarding their salutary advice, he joined his forces to those of the Nu-che. The Kitan were then every where defeated; and at last reduced to such extremity, that those who remained were forced to leave their country, and fly to the mountains of the west.

Thus the empire of the Kitan was totally destroyed, but nothing to the advantage of the Chinese; for the Tartar general, elated with his conquest, gave the name of *Kin* to his new dominion, assumed the title of emperor, and began to think of aggrandizing himself and enlarging his empire. For this purpose, he immediately broke the treaties concluded with the Chinese emperor; and, invading the provinces of Pecheli and Shen-si, made himself master of the greater

part of them. Whey-tsong, finding himself in danger of losing his dominions, made several advantageous proposals to the Tartar; who, seeming to comply with them, invited him to come and settle matters by a personal conference. The Chinese monarch complied; but, on his return, the terms agreed on seemed intolerable to his ministers; so that they told him the treaty could not subsist, and that the most cruel war was preferable to such an ignominious peace. The Kin monarch, being informed of all that passed, had recourse to arms, and took several cities. Whey-tsong was weak enough to go in person to hold a second conference; but, on his arrival, was immediately seized by the Tartar. He was kept prisoner under a strong guard during the remaining part of his life; and ended his days in 1126, in the desert of Shamo, having nominated his eldest son Kin-tsong to succeed him.

Kin-tsong began his reign with putting to death six ministers of state, who had betrayed his father into the hands of the Kin Tartars. The barbarians in the mean time pursued their conquests without opposition. They crossed the Whang-ho, or Yellow River, which an handful of troops might have prevented; and marching directly towards the imperial city, took and plundered it. Then seizing the emperor and his consort, they carried them away captives; but many of the principal lords, and several of the ministers, preferring death to such an ignominious bondage, killed themselves. The Kin being informed by the empress *Meng* that he had been divorced, they left her behind. This proved the means of saving the empire; for by her wisdom and prudence she got the crown placed on the head of Kau-tsong, ninth son of the emperor Whey-tsong by his divorced empress.

Kau-tsong fixed his court at Nanking the capital of Kyang-nan; but soon after was obliged to remove it to Kang-chew in Che-kyang. He made several efforts to recover some of his provinces from the Kin, but without effect. Ili-tsong the Kin monarch, in the mean time, endeavoured to gain the esteem of his Chinese subjects by paying a regard to their learning and learned men, and honouring the memory of Confucius. Some time after, he advanced to Nanking, from whence Kau-tsong had retired, and took it; but, receiving advice that Yo-si, general of the Song, or southern Chinese, was advancing by long marches to the relief of that city, they set fire to the palace, and retired northward. However, Yo-si arrived time enough to fall upon their rear-guard, which suffered very much; and from this time the Kin never dared to cross the river Yangtze. In a few years afterwards the Chinese emperor submitted to become tributary to the Kin, and concluded a peace with them upon very dishonourable terms. This submission, however, was of little avail: for, in 1163, the Tartars broke the peace; and, invading the southern province with a formidable army, took the city of Yang-chew. The king, having approached the river Yangtze, near its mouth, where it is widest as well as most rapid, commanded his troops to cross it, threatening with his drawn sword to kill those who refused. On receiving such an unreasonable command, the whole army mutinied; and the king being killed in the beginning

China.

[14]
They take
the emperor
prisoner.
or.

15
Imperial city
and emperor
taken.

16
Progress of
the Kin
checked.

13
Kitan driven
out by the
eastern
Tartars.

14
Who assume
the name of
Kin, and
invade China.

China.

17
They are
attacked by
Jenghiz-
khan and
the king of
Hya.

gining of the tumult, the army immediately retired.

From this time to the year 1210, nothing remarkable occurs in the Chinese history; but this year, Jenghiz-khan, chief of the western Tartars, *Moguls*, or *Mungli*, quarrelled with Yong-tsi emperor of the Kin; and at the same time the king of Hya, disgusted at being refused assistance against Jenghiz-khan, threatened him with an invasion on the west-side. Yong-tsi prepared for his defence; but in 1211, receiving news that Jenghiz-khan was advancing southward with his whole army, he was seized with fear, and made proposals of peace, which were rejected. In 1212, the Mogul generals forced the great wall; or, according to some writers, had one of the gates treacherously opened to them, to the north of Shan-ti; and made incursions as far as Peking the capital of the Kin empire. At the same time the province of Lyan-tong was almost totally reduced by several Kitan lords who had joined Jenghiz-khan; several strong places were taken, and an army of 300,000 Kin defeated by the Moguls. In autumn they laid siege to the city of Tay-tong-fu; where, although the governor Hujaku fled, yet Jenghiz-khan met with considerable resistance. Having lost a vast number of men; and being himself wounded by an arrow, he was obliged to raise the siege and retire into Tartary; after which the Kin retook several cities. The next year, however, Jenghiz-khan re-entered China; retook the cities which the Kin had reduced the year before; and overthrew their armies in two bloody battles, in one of which the ground was strewn with dead bodies for upwards of four leagues.

The same year Yong-tsi was slain by his general Hujaku; and Sun, a prince of the blood, advanced in his room. After this the Moguls, attacking the empire with four armies at once, laid waste the provinces of Shan-ti, Honan, Pecheli, and Shantung. In 1214 Jenghiz-khan sat down before Peking; but instead of assaulting the city, offered terms of peace, which were accepted, and the Moguls retired into Tartary. After their departure, the emperor, leaving his son at Peking, removed his court to Pien-lyang near Kay-fong-fu, the capital of Honan. At this Jenghiz-khan being offended, immediately sent troops to besiege Peking. The city held out to the fifth month of the year 1215, and then surrendered. At the same time the Moguls finished the conquest of Lyan-tong; and the Song refused to pay the usual tribute to the Kin.

In 1216, Jenghiz-khan returned to pursue his conquests in the west of Asia, where he fluid seven years; during which time his general Muhli made great progress in China against the Kin emperor. He was greatly assisted by the motions of Ning-tsong emperor of the Song, or southern China; who, incited by the frequent perfidies of the Kin, had declared war against them, and would hearken to no terms of peace, though very advantageous proposals were made. Notwithstanding this, however, in 1220, the Kin, exerting themselves, raised two great armies, one in Shen-ti, and the other in Shang-tong. The former baffled the attempts of the Song and king of Hya, who had united against them; but the latter, though no fewer than 200,000, were entirely defeated by Muhli. In 1221,

that officer passed the Whang-ho, and died after conquering several cities.

In 1224, the Kin emperor died; and was succeeded by his son Shew, who made peace with the king of Hya: but next year, that kingdom was entirely destroyed by Jenghiz-khan. In 1226, Oktay son to Jenghiz-khan marched into Honan, and besieged Kay-Song-fu, capital of the Kin empire; but was obliged to withdraw into Shen-ti, where he took several cities, and cut in pieces an army of 30,000 men. In 1227 Jenghiz-khan died, after having desired his sons to demand a passage for their army through the dominions of the Song, without which he said they could not easily vanquish the Kin.

After the death of that great conqueror, the war was carried on with various success; but though the Moguls took above 60 important posts in the province of Shen-ti, they found it impossible to force Tong-quan, which it behoved them to do in order to penetrate effectually into Honan. In April 1231 they took the capital of Shen-ti, and defeated the Kin army which came to its relief. Hereupon Toley, having assembled all his forces, sent a messenger to the Song generals to demand a passage through their territories. This, however, they not only refused, but put the messenger to death; which so enraged Toley that he swore to make them repent of it, and was soon as good as his word. He decamped in August 1231; and having forced the passages, put to the sword the inhabitants of

Wha-yang and Pong-chew, two cities in the district of Han-chong-fu. Then having cut down rocks to fill up deep abysses, and made roads through places almost inaccessible, he came and besieged the city of Han-chong-fu itself. The miserable inhabitants fled to the mountains on his approach, and more than 100,000 of them perished. After this, Toley divided his forces, consisting of 30,000 horse, into two bodies. One of these went westward to Myen-chew: from thence, after opening the passages of the mountains, they arrived at the river Kyaling, which runs into the great Kyang. This they crossed on rafts made of the wood of demolished houses; and then, marching along its banks, seized many important posts. At last, having destroyed more than 140 cities, towns, or fortresses, they returned to the army. The second detachment seized an important post in the mountains, called *Tantong*, six or seven leagues to the eastward of Han-chong-fu. On the other side Oktay advanced, in October, towards Pu-chew a city of Shan-ti; which being taken after a vigorous defence, he prepared to pass the Whang-ho. Toley, after surmounting incredible difficulties, arrived in December on the borders of Honan, and made a shew as if he designed to attack the capital of the Kin empire. On his first appearance in Honan through a passage so little suspected, every body was filled with terror and astonishment, so that he proceeded for some time without opposition. At last the emperor ordered his generals, Hota, Ilapua, and others, to march against the enemy.

Toley

China.

21
Jenghiz-
khan de-
stroys the
kingdom of
Hya.

22
And dies.

23
Moguls
quarrel
with the
Song.

24
Exploits of
Toley.

18
Great wall
forced by
Jenghiz-
khan.

19
Peking ta-
ken.

20
Southern
Chinese de-
clare war
against the
Kin.

China.

Tolcy boldly attacked them; but was obliged to retire, which he did in good order. Hota was for pursuing him, saying that the Mogul army did not exceed 30,000 men, and that they seemed not to have eaten any thing for two or three days. Ilapua, however, was of opinion that there was no occasion for being so hasty, as the Moguls were inclosed between the rivers Han and Whang-ho, so that they could not escape. This negligence they soon had occasion to repent of: for Tolcy, by a stratagem, made himself master of their heavy baggage; which accident obliged them to retire to Tang-chew. From thence they sent a messenger to acquaint the emperor that they had gained the battle, but concealed the loss of their baggage. This good news filled the court with joy; and the people who had retired into the capital for its defence, left it again, and went into the country; but, in a few days after, the vanguard of the Moguls, who had been sent by the emperor Oktay, appeared in the field, and carried off a great number of those that had quitted the city.

25
Capital of
the Kin em-
pire besieged.

In January 1232, Oktay passing the Whang-ho; encamped in the district of Kay-fong-fu, capital of the Kin empire, and sent his general Suputay to besiege the city. At that time the place was near 30 miles in circumference: but having only 40,000 soldiers to defend it, as many more from the neighbouring cities, and 20,000 peasants, were ordered into it; while the emperor published an affecting declaration, animating the people to defend it to the last extremity. Oktay, having heard with joy of Tolcy's entrance into Honan, ordered him to send succours to Suputay. On the other hand, the Kin generals advanced with 150,000 men to relieve the city; but being obliged to divide their forces in order to avoid in part the great road which Tolcy had obstructed with trees, they were attacked by that prince at a disadvantage, and, after a faint resistance, defeated with great slaughter, and the loss of both their generals, one killed and the other taken. The emperor now ordered the army at Tong-quan and other fortified places, to march to the relief of Kay-fong-fu. They assembled accordingly, to the number of 110,000 foot and 15,000 horse; and were followed by vast numbers of people who expected by their means to be protected from the enemy. But many of those troops having deserted, and the rest being enfeebled by the fatigues of their march, they dispersed on the approach of their pursuers, who killed all they found in the highways. After this the Moguls took Tong-quan and some other considerable posts; but were obliged to raise the sieges of Quey-te-fu and Loyang, by the bravery of the governors. Kyang-shin, governor of Loyang, had only 3 or 4000 soldiers under him, while his enemies were 30,000 strong. He placed his worst soldiers on the walls, putting himself at the head of 400 brave men; whom he ordered to go naked, and whom he led to all dangerous attacks. He invented engines to cast large stones, which required but few hands to play them, and aimed so true as to hit at 100 paces distance. When their arrows failed, he cut those shot by the enemy into four pieces; pointed them with pieces of brass coin; and discharged them from wooden tubes with as much force as bullets are from a musket.

Thus he harrassed the Moguls for three months so grievously, that they were obliged, notwithstanding their numbers, to abandon the enterprise.

Oktay, at last, notwithstanding his successes, resolved to return to Tartary; and offered the Kin emperor peace, provided he became tributary, and delivered up to him 27 families which he named. These offers were very agreeable to the emperor; but Suputay, taking no notice of the treaty, pushed on the siege of the capital with more vigour than ever. By the help of the Chinese slaves in his army, the Mogul general soon filled the ditch; but all his efforts seemed only to inspire the besieged with new vigour. The Moguls at that time made use of artillery, but were unable to make the least impression upon the city walls. They raised walls round those they besieged, which they fortified with ditches, towers, and battlements. They proceeded also to sap the walls of the city; but were very much annoyed by the artillery of the besieged, especially by their bombs, which sinking into the galleries, and bursting under ground, made great havoc among the miners. For 16 days and nights the attacks continued without intermission; during which time an incredible number of men perished on both sides: at length, Suputay, finding that he could not take the city, withdrew his troops, under pretence of conferences being on foot. Soon after, the plague cluded; began in Kay-fong-fu; and raged with such violence, that, in 50 days, 900,000 biers were carried out, besides a vast multitude of the poorer sort who could not afford any.

In a short time, two unlucky accidents occasioned a renewal of the war; which now put an end to the empire of the Kin. Gan-yong, a young Mogul lord, having assumed the government of some cities in Kyang-nan, and killed the officer sent to take possession of them, declared for the Kin. The emperor unwarily took Gan-yong into his service, and gave him the title of Prince. Upon this Oktay sent an envoy, attended by 30 other persons, to inquire into the affair; but the Kin officers killed them all, without being punished by the emperor. Suputay, having informed his master of all these proceedings, was ordered to continue the war in Honan. Shew-fu now commanded his officers to unite their troops for the defence of the capital; but before his orders could be obeyed, they were attacked and defeated, one after another, by the Moguls. This obliged him to raise soldiers from among the peasants, for whose subsistence the people were taxed $\frac{1}{3}$ of the rice they possessed. The city began now to be distressed for want of provisions; and as it was but in a bad posture of defence, the emperor marched with an army against the Moguls. His expedition proved unfortunate; for, sending part of his army to besiege a city called Why-chew, it was totally cut in pieces, and Suputay a second time sat down before the capital.

On hearing this bad news, the emperor repassed the Whang-ho, and retired to Quey-te-fu. Here he had not been long, before the capital was delivered up by treachery, and Suputay put all the males of the imperial race to death; but, by the express command of Oktay, spared the inhabitants, who are said to have amounted to 1,430,000 families. After this disaster the

China.

26
Bravery of
the besieged.

27
Peace con-
cluded;

28
And broken
em.

29
Capital again
besieged.

30
And taken.

China. the unhappy monarch left his troops at Quey-te-fu, and retired to Juning-fu, a city in the southern part of Honan, attended only by 400 persons. Here the diffidence of the Moguls made him think of living at ease; but while he flattered himself with these vain hopes, the enemy's army arrived before the city and invested it. The garrison were terrified at their approach; but were encouraged by the emperor, and his brave general Hu-fye-hu, to hold out to the last. As there were not in the city a sufficient number of men, the women, dressed in men's clothes, were employed to carry wood, stones, and other necessary materials to the walls. All their efforts, however, were ineffectual. They were reduced to such extremities, that for three months they fed on human flesh; killing the old and feeble, as well as many prisoners, for food. This being known to the Moguls, they made a general assault in January 1234. The attack continued from morning till night; but at last the assailants were repulsed. In this action, however, the Kin lost all their best officers; upon which the emperor resigned the crown to Cheng-lin a prince of the blood. Next morning, while the ceremony of investing the new emperor was performing, the enemy mounted the south walls, which were defended only by 200 men; and the south gate being at the same time abandoned, the whole army broke in. They were opposed, however, by Hu-fye-hu; who, with 1000 soldiers, continued to fight with amazing intrepidity. In the mean time Shew-fu, seeing every thing irreparably lost, lodged the seal of the empire in a house; and then causing sheaves of straw to be set round it, ordered it to be set on fire as soon as he was dead. After giving this order he hanged himself, and his commands were executed by his domestics. Hu-fye-hu, who still continued fighting with great bravery, no sooner heard of the tragical death of the emperor, than he drowned himself in the river Ju; as did also 500 of his most resolute soldiers. The same day the new emperor, Cheng-lin, was slain in a tumult; and thus an end was put to the dominion of the Kin Tartars in China.

The empire of China was now to be shared between the Song, or southern Chinese, and the Moguls. It had been agreed upon, that the province of Honan should be delivered up to the Song as soon as the war was finished. But they, without waiting for the expiration of the term, or giving Oktay notice of their proceedings, introduced their troops into Kay-fong-fu, Lo-yang, and other considerable cities. On this the Mogul general resolved to attack them; and re-passing the Whang-ho, cut in pieces part of the garrison of Lo-yang, while they were out in search of provisions. The garrison of Kay-fong-fu likewise abandoned that place; and the Song emperor degraded the officers who had been guilty of those irregularities, sending ambassadors to Oktay, at the same time, to desire a continuance of the peace. What Oktay's answer was we are not told, but the event shewed that he was not well pleased; for, in 1235, he ordered his second son Prince Kotovan, and his general Chahay, to attack the Song in Se-chwen, while others marched towards the borders of Kyang-nan.

In 1236, the Moguls made great progress in the province of Huquang, where they took several cities, Vol. III.

and put vast numbers to the sword. This year they introduced paper or silk money, which had formerly been used by Chang-t'ong, sixth emperor of the Kin. Prince Kotovan forced the passages into the district of Han-chong-fu in the province of Shenfi, which he entered with an army of 500,000 men. Here a terrible battle was fought between the vast army of the Moguls and the Chinese troops, who had been driven from the passages they defended. The latter consisted only of 10,000 horse and foot, who were almost entirely cut off; and the Moguls lost such a number of men, that the blood is said to have run for two leagues together. After this victory the Moguls entered Se-chwen, which they almost entirely reduced, committing such barbarities, that, in one city, 40,000 people chose rather to put an end to their own lives than submit to such cruel conquerors.

In 1237, the Moguls received a considerable check before the city of Kantong in Kyang-nan, the siege of which they were obliged to raise with loss. In 1238 they besieged Lu-chew, another city in the same province. They surrounded it with a rampart of earth and a double ditch; but the Chinese general ordered their intrenchments to be filled with immense quantities of herbs steeped in oil, and then set on fire; while he shot stones upon them from a tower seven stories high. At the same time a vigorous sally was made; and the Mogul army being thrown into the utmost disorder, were obliged finally to abandon the siege, and retire northwards.

In 1239, these barbarians were opposed by a general called Meng-kong, with great success; who this and the following year, gained great honour by his exploits. While he lived, the Moguls were never able to make any considerable progress; but his death, in 1246, proved of the greatest detriment to the Chinese affairs; and soon after, the Tartars renewed the war with more vigour and success than ever. In 1255, they re-entered the province of Se-chwen; but still met with vigorous opposition in this quarter, because the Chinese took care to have Se-chwen furnished with good troops and generals. Though they were always beaten, being greatly inferior in number to their enemies, yet they generally retook the cities the Moguls had reduced, as the latter were commonly obliged to withdraw for want of provisions and forage. In 1259 they undertook the siege of Ho-chew, a strong city to the west of Peking, defended by Vang-kyen, a very able officer, who commanded a numerous garrison. The siege continued from the month of February till August, during which time the Moguls lost an immense number of men. On the 10th of August they made a general assault in the night. They mounted the walls before the governor had intelligence; but were soon attacked by him with the utmost fury. The Mogul emperor, Meng-ko, himself came to the scalade; but his presence was not sufficient to overcome the valour of Vang-kyen. At the same time the scaling-ladders of the Moguls were blown down by a storm; upon which a terrible slaughter ensued, and among the rest fell the emperor himself. Upon this disaster the Mogul generals agreed to raise the siege, and retire towards Shen-fi.

On the death of Meng-ko, Hupilay, or Kublay Khan,

China.
34
Dreadful
engagement.

32
Unhappy
fate of the
emperor.

33
Dissolution
of the Kin
empire.

34
War between
the Song
and the Moguls.

35
Siege of
Ho-chew.

36
Moguls de-
feated, and
their emperor
killed.

China.

who succeeded him, laid siege to Vu-chang-fu, a city not far distant from the capital of the Song empire. At this the emperor being greatly alarmed, distributed immense sums among his troops; and having caused great levies to be made throughout the empire, sent a formidable army to the relief of Vu-chang-fu. Unfortunately the command of this army was committed to the care of Kya-tse-tau, a man without either courage or experience in war. He was besides very vain and vindictive in his temper; often using the best officers ill, and entirely overlooking their merit, which caused many of them to go over to the Moguls. The siege of Vu-chang-fu was commenced, and had continued a considerable time, when Kya-tse-tau, afraid of its being lost, and at the same time not daring to take any effectual step for its relief, made proposals of peace. A treaty was accordingly concluded, by which Kya-tse-tau engaged to pay an annual tribute of about L. 50,000 in silver; and as much in silk; acknowledging likewise the sovereignty of the Moguls over the Song empire. In consequence of this treaty, the Moguls retreated after the boundaries of the two empires had been fixed, and repassed the Kyang; but 170 of them having flaid on the other side of the river, were put to death by Kya-tse-tau.

37
Treachery
of a Chi-
nese mini-
ster.

This wicked minister totally concealed from the emperor his having made such a shameful treaty with the Moguls; and the 170 foldiers massacred by his order, gave occasion to a report that the enemy had been defeated; so that the Song court believed that they had been compelled to retreat by the superior valour and wisdom of Kya-tse-tau. This proved the ruin of the empire; for, in 1260, the Mogul emperor sent Haukung to the Chinese court to execute the treaty according to the terms agreed on with Kya-tse-tau. The minister, dreading the arrival of this envoy, imprisoned him near Nanking; and took all possible care that neither Hupilay, nor Li-tsong the Chinese emperor, should ever hear any thing of him.

It was impossible such unparalleled conduct could fail to produce a new war. Hupilay's courtiers incessantly pressed him to revenge himself on the Song for their treacherous behaviour; and he soon published a manifesto against them, which was followed by a renewal of hostilities in 1268. The Mogul army amounted to 500,000 men; but notwithstanding their numbers, little progress was made till the year 1271. Syan-yang and Fan-ching, cities in the province of Se-chew, had been besieged for a long time ineffectually; but this year an *Igar* lord advised Hupilay to send for several of those engineers out of the west, who knew how to cast stones of 150 pounds weight out of their engines, which made holes of seven or eight feet wide in the strongest walls. Two of these engineers were accordingly sent for; and after giving a specimen of their art before Hupilay, were sent to the army in 1272. In the beginning of 1273 they planted their engines against the city of Fan-ching, and presently made a breach in the walls. After a bloody conflict the suburbs were taken; and soon after the Moguls made themselves masters of the walls and gates of the city. Nevertheless a Chinese officer, with only 100 soldiers, refused to fight from street to street. This he did for a long time with the greatest obstinacy,

38
Desperate
conflict.

killing vast numbers of the Moguls; and both parties are said to have been so much overcome with thirst, that they drank human blood to quench it. The Chinese set fire to the houses, that the great beams, falling down, might embarrass the way of their pursuers; but at last being quite wearied out, and filled with despair, they put an end to their own lives. After the taking of Fan-ching, all the materials which had served at the siege were transported to Syen-yang. The two engineers posted themselves against a wooden retrenchment raised on the ramparts. This they quickly demolished; and the besieged were so intimidated by the noise and havoc made by the stones cast from these terrible engines, that they immediately surrendered.

In 1274 Pe-yen, an officer of great valour, and endowed with many other good qualities, was promoted to the command of the Mogul army. His first exploits were the taking of two strong cities; after which he passed the great river Ky-ang, defeated the Song army, and laid siege to Vu-chang-fu. This city was soon intimidated into a surrender; and Pe-yen, by restraining the barbarity of his soldiers, whom he would not allow to hurt any body, soon gained the hearts of the Chinese so much, that several cities surrendered to him on the first summons. In the mean time the treacherous Kya-tse-tau, who was sent to oppose Pe-yen, was not ashamed to propose peace on the terms he had formerly concluded with Hupilay; but these being rejected, he was obliged at length to come to an engagement. In this he was defeated, and Pe-yen continued his conquests with great rapidity. Having taken the city of Nanking, and some others, he marched towards Hang-chew-fu, the capital of the Song empire. Peace was now again proposed, but rejected by the Mogul general; and at last the empress was constrained to put herself, with her son, then an infant, into the hands of Pe-yen, who immediately sent them to Hupilay.

39
Chinese
Empress
submits.

The submission of the empress did not yet put an end to the war. Many of the chief officers swore to do their utmost to rescue her from the hands of her enemies. In consequence of this resolution they distributed their money among the soldiers, and soon got together an army of 40,000 men. This army attacked the city where the young emperor Kongsong was lodged, but without success; after which, and several other vain attempts, they raised one of his brothers to the throne, who then took upon him the name of Twon-tsong. He was but nine years of age when he was raised to the imperial dignity, and enjoyed it but a very short time. In 1277 he was in great danger of perishing, by reason of the ship on board which he then was being cast away. The poor prince fell into the water, and was taken up half dead with the fight. A great part of his troops perished at that time, and he soon after made offers of submission to Hupilay. These, however, were not accepted; for, in 1278, the unhappy Twon-tsong was obliged to retire into a little desert island on the coast of Quang-tong, where he died in the 11th year of his age.

Notwithstanding the progress of the Moguls, vast territories still remained to be subdued before they could

40
Dissolution
of the Song
empire.

China.

could become masters of all the Chinese empire. On the death of T'won-t'ong, therefore, the mandarins raised to the throne his brother, named Te-ping, at that time but eight years of age. His army consisted of no fewer than 200,000 men; but being utterly void of discipline, and entirely ignorant of the art of war, they were defeated by 20,000 Mogul troops. Nor was the fleet more successful; for being put in confusion by that of the Moguls, and the emperor in danger of falling into their hands, one of the officers taking him on his shoulders, jumped with him into the sea, where they were both drowned. Most of the mandarins followed this example, as did also the empress and minister, all the ladies and maids of honour, and multitudes of others, inasmuch that 100,000 people are thought to have perished on that day. Thus ended the Chinese race of emperors; and the Mogul dynasty, known by the name of *Yuen*, commenced.

47
Reign of
Hupilay.

Though no race of men that ever existed were more remarkable for cruelty and barbarity than the Moguls; yet it doth not appear, that the emperors of the *Yuen* dynasty were in any respect worse than their predecessors. On the contrary, Hupilay, by the Chinese called *Shi-tu*, found the way of reconciling the people to his government, and even of endearing himself to them so much, that the reign of his family is to this day styled by the Chinese *the wise government*. This he accomplished by keeping as close as possible to their ancient laws and customs; by his mild and just government; and by his regard for their learned men. He was indeed ashamed of the ignorance and barbarity of his Mogul subjects, when compared with the Chinese. The whole knowledge of the former was summed up in their skill in managing their arms and horses, being perfectly destitute of every art or science, or even of the knowledge of letters. In 1269, he had caused the Mogul characters to be contrived. In 1280, he caused some mathematicians search for the source of the river Whang-ho, which at that time was unknown to the Chinese themselves. In four months time they arrived in the country where it rises, and made a map of it, which they presented to his majesty. The same year a treatise on astronomy was published by his order; and, in 1282, he ordered the learned men to repair from all parts of the empire to examine the state of literature, and take measures for its advancement.

At his first accession to the crown he fixed his residence at Tay-ywen-fu, the capital of Shen-si; but thought proper afterwards to remove it to Peking. Here, being informed that the barks which brought to court the tribute of the southern provinces, or carried on the trade of the empire, were obliged to come by sea, and often suffered shipwreck, he caused that celebrated canal to be made, which is at present one of the wonders of the Chinese empire, being 300 leagues in length. By this canal above 9000 imperial barks transport with ease, and at small expence, the tribute of grain, rice, silks, &c. which is annually paid to the court. In the third year of his reign Shi-tu formed a design of reducing the islands of Japan, and the kingdoms of Tonkin and Cochinchina. Both these enterprizes ended unfortunately, but the first remarkably so; for of 100,000 persons employed in

it, only four or five escaped with the melancholy news of the destruction of the rest, who all perished by shipwreck. Shi-tu reigned 15 years, died in the 80th year of his age, and was succeeded by his grandson. The throne continued in the *Yuen* family till the year 1367, when Shun-ti the last of that dynasty was driven out by a Chinese named Chu. During this period the Tartars had become enervated by long prosperity; and the Chinese had been roused into valour by their subjection. Shun-ti, the reigning prince, was quite sunk in sloth and debauchery; and the empire, besides, was oppressed by a wicked minister named Ama. In June 1355, Chu, a Chinese of mean extraction, and head of a small party, set out from Ho-chew, passed the Kyang, and took Tay-ping. He then associated himself with some other malcontents, at the head of whom he reduced the city of Ta-chew, in Kyang-nan. Soon after he made himself master of Nanking, having defeated the Moguls who came to his relief. In December 1356, he was able to raise 100,000 men, at the head of whom he took the city of U-chew, in the east borders of *Quangsi*; and here, assembling his generals, it was resolved neither to commit slaughters nor to plunder. The most formidable enemy he had to deal with was *Chen-yew-lyang*, styled "emperor of the Han." This man being grieved at the progress made by Chu, equipped a fleet, and raised a formidable army, in order to reduce Nan-chang-fu, a city of Kyang-li, which his antagonist had made himself master of. The governor, however, found means to inform Chu of his danger, upon which that chief caused a fleet to be fitted out at Nanking, in which he embarked 200,000 soldiers. As soon as *Chen-yew-lyang* was informed of his enemy's approach, he raised the siege of Nan-chang-fu, and gave orders for attacking Chu's naval force. An engagement ensued between a part of the fleets, in which Chu proved victorious; and next day, all the squadrons having joined, in order to come to a general engagement, Chu gained a second victory, and burnt 100 of the enemy's vessels. A third and fourth engagement happened, in both which Chu gained the victory; and in the last, *Chen-yew-lyang* himself was killed, his son taken prisoner, and his generals obliged to surrender themselves, with all their forces and vessels.

In January 1364, Chu's generals proposed to have He proclaimed emperor; but this he declined, and at first contented himself with the title of King of U. In February he made himself master of *Vu-chang-fu*, capital of *Hu-quang*; where, with his usual humanity, he relieved those in distress, encouraged the literati, and would allow his troops neither to plunder nor destroy. This wise conduct procured him an easy conquest both of *Kyang-li* and *Hu-quang*. The Chinese submitted to him in crowds, and professed the greatest veneration and respect for his person and government.

All this time Shun-ti, with an unaccountable negligence, never thought of exerting himself against Chu; but continued to employ his forces against the rebels who had taken up arms in various parts of the empire; so that Chu found himself in a condition to assume the title of emperor. This he chose to do at Nanking on the first day of the year 1368. After this his troops

11 K 2

entered

China.

42
Moguls driven out.

43
Exploits of
Chu.

44
He is proclaimed
king of U.

45
Becomes
emperor of
China.

China. entered the province of Honan, which they presently reduced. In the third month, Chu, who had now taken the title of *Hong-yu* or *Tay-tyi*, reduced the fortresses of Tong-quin, after which his troops entered Pecheli from Honan on the one side, and Shan-tong on the other. Here his generals defeated and killed one of Shun-ti's officers; after which they took the city of Tong-chew, and then prepared to attack the capital, from which they were now but 12 miles distant. On their approach the emperor fled with all his family beyond the great wall, and thus put an end to the dynasty of Ywen. In 1370 he died, and was succeeded by his son, whom the successor of Hong-yu drove beyond the Kobi or Great Desert, which separates China from Tartary. They continued their incursions, however, for many years; nor did they cease their attempts till 1583, when vast numbers of them were cut in pieces by the Chinese troops.

46
Moguls driven beyond the desert.

47
China again conquered by the Tartars.

The 21st dynasty of Chinese emperors, founded in 1368 by Chu, continued till the year 1644, when they were again expelled by the Tartars. The last Chinese emperor was named Whay-tsong, and ascended the throne in 1623. He was a great lover of the sciences, and a favourite of the Christians; though much addicted to the superstitions of the Bonzes. He found himself engaged in a war with the Tartars, and a number of rebels in different provinces. That he might more effectually suppress the latter, he resolved to make peace with the former; and for that end sent one of his generals, named *Tuen*, into Tartary, at the head of an army, with full power to negotiate a peace; but that traitor made one upon such shameful terms, that the emperor refused to ratify it. Ywen, in order to oblige his master to comply with the terms made by himself, poisoned his best and most faithful general, named *Mau-ven-long*; and then desired the Tartars to march directly to Peking, by a road different from that which he took with his army. This they accordingly did, and laid siege to the capital. Ywen was ordered to come to its relief; but, on his arrival, was put to the torture and strangled; of which the Tartars were no sooner informed, than they raised the siege, and returned to their own country. In 1636, the rebels above-mentioned composed four great armies, commanded by as many generals; which, however, were soon reduced to two, commanded by Li, and Chang. These agreed to divide the empire between them; Chang taking the western provinces, and Li the eastern ones. The latter seized on part of Shen-ti, and then of Honan, whose capital, named Kay-fong-fu, he laid siege to, but was repulsed with loss. He renewed it six months after, but without success; the besieged clung rather to feed on human flesh than surrender. The Imperial forces coming soon after to its assistance, the general made no doubt of being able to destroy the rebels at once, by breaking down the banks of the Yellow River; but unfortunately the rebels escaped to the mountains, while the city was quite overflowed, and 300,000 of the inhabitants perished.

After this disaster, Li marched into the provinces of Shen-ti and Honan; where he put to death all the mandarins, exacted great sums from the officers in place, and shewed no favour to any but the populace,

whom he freed from all taxes: by this means he drew so many to his interest, that he thought himself strong enough to assume the title of emperor. He next advanced towards the capital, which, though well garrisoned, was divided into factions. Li had taken care to introduce before-hand a number of his men in disguise; and by these the gates were opened to him the third day after his arrival. He entered the city in triumph at the head of 300,000 men; whilst the emperor kept himself shut up in his palace, busied only with his superstitions. It was not long, however, before he found himself betrayed; and, under the greatest consternation, made an effort to get out of the palace, attended by about 600 of his guards. He was still more surprised to see himself treacherously abandoned by them, and deprived of all hopes of escaping the insults of his subjects. Upon this, preferring death to the disgrace of falling alive into their hands, he immediately retired with his empress, whom he tenderly loved, and the prince's her daughter, into a private part of the garden. His grief was so great that he was not able to utter a word; but the soon understood his meaning, and, after a few silent embraces, hanged herself on a tree in a silken robe. Her husband staid only to write these words on the border of his vest: "I have been basely deserted by my subjects; do what you will with me, but spare my people." He then cut off the young prince's head with one stroke of his scymitar, and hanged himself on another tree, in the 17th year of his reign, and 36th of his age. His prime minister, queens, and eunuchs, followed his example; and thus ended the Chinese monarchy, to give place to that of the Tartars, which hath continued ever since.

It was some time before the body of the unfortunate monarch was found. At last it was brought before the rebel Li, and by him used with the utmost indignity; after which he caused two of Whay-tsong's sons, and all his ministers, to be beheaded; but his eldest son happily escaped by flight. The whole empire submitted peaceably to the usurper, except prince U-fan-ghey, who commanded the imperial forces in the province of Lyau-tong. This brave prince, finding himself unable to cope with the usurper, invited the Tartars to his assistance, and Tsong-te their king immediately joined him with an army of 80,000 men. Upon this the usurper marched directly to Peking; but not thinking himself safe there, plundered and burnt the palace, and then fled with the immense treasure he had got. What became of him afterwards we are not told; but the young Tartar monarch was immediately declared emperor of China, his father Tsong-te having died almost as soon as he set his foot in that empire.

The new emperor, named *Shun-chi*, or *Xun-chi*, began his reign with rewarding U-fan-ghey, by conferring upon him the title of King; and assigned him the city of Si-gnan-fu, capital of Shen-ti, for his residence. This, however, did not hinder U-fan-ghey from repenting of his error in calling in the Tartars, or, as he himself used to phrase it, "in sending for lions to drive away dogs." In 1674, he formed a very strong alliance against them, and had probably prevailed if his allies had been faithful. But they treacherously deserted him one after another; which so affected him,

China.

48

Unhappy fate of the emperor and his family.

than

China.

that he died soon after. In 1681 Hong-wha, son to U-san-ghyey, who continued his efforts against the Tartars, was reduced to such straits that he put an end to his own life.

During this space, there had been some resistance made to the Tartars in many of the provinces. Two princes of Chinese extraction had at different times been proclaimed emperors; but both of them were overcome and put to death. In 1682, the whole 15 provinces were so effectually subdued, that the emperor Kang-hi, successor to Shun-chi, determined to visit his native dominions of Tartary. He was accompanied by an army of 70,000 men, and continued for some months taking the diversion of hunting. This he continued to do for some years; and in his journeys took father Verbiest along with him, by which means we have a better description of these countries than could possibly have been otherwise obtained. This prince was a great encourager of learning, and of the Christian religion; in favour of which last he published a decree, dated in 1692. In 1716, however, he revived some obsolete laws against the Christians, nor could the Jesuits with all their art preserve the footing they had got in China. The causes of this alteration in his resolution are, by the missionaries, said to have been the slanders of the mandarins; but, from the known character of the Jesuits, it will be readily believed, that there was something more at bottom. This emperor died in 1722, and was succeeded by his son Yong-ching; who not only gave no encouragement to the missionaries, but persecuted all Christians of whatever denomination, not excepting even those of the imperial race. At the beginning of his reign he banished all the Jesuits into the city of Canton, and in 1732 they were banished from thence into Ma-kau, a little island inhabited by the Portuguese, but subject to China. He died in 1736; but though the Jesuits entertained great hopes from his successor, we have not heard that they have yet met with any success.

Thus we have given an account of the most memorable transactions recorded in the Chinese history. It now remains only to describe the present state of the empire and its inhabitants, according to the best and latest accounts.

The division of China into 15 provinces, we have already mentioned. In such a vast tract of country, it is impossible that either the climate or soil should be alike in all places. The climate, however, is, in general, reckoned very moderate, except in the northern provinces, where the cold is extremely piercing, owing to the high ridges of mountains with which those parts are intersected, and which are always covered with snow. Even in those parts which lie under the tropics, the winds that blow from the northern mountains, make the winter, which continues for three or sometimes four months, extremely cold and piercing. The southern parts are excessively hot and dry; but the heats are more easily borne by means of the cooling grooves, groves, &c. to which the inhabitants retire in the heat of the day, when there is the same universal silence and cessation from business as if it was midnight. These parts have neither frost nor snow; but are much troubled with storms and violent rains, about the time of the equinoxes, especially the

autumnal, which is all the winter they have. They enjoy a serene sky all the rest of the year. It is, however, universally acknowledged, that where nature has been most unequal in the distribution of her gifts, the inhabitants have remedied these inconveniences as far as human industry could go. In some provinces, they have levelled whole ridges of mountains; in others, they have raised artificial ones. In some, they have provided fences against excessive colds; in others, against heats and droughts, &c. In short, by varying their agriculture, manuring, and planting, according to the differences of soils and climates, almost every spot throughout this vast empire produces more than enough to make its inhabitants rich and happy. All these advantages are farther improved by the vast number of canals cut from one river to another, and the innumerable carriages they keep up by land, by which each canton may easily communicate its own peculiar product to all the rest.

On these accounts, the Chinese entertained the most extraordinary opinion of themselves and their country. The advantages they had over those neighbouring nations they knew or heard of, appeared to them so considerable, that they looked upon themselves as the only favourites of heaven, and the rest of mankind as barbarians, whom they represented as monsters, dwarfs, and contemptible creatures. They looked upon their country to be placed in the centre of the earth; and themselves as the only people who had a human shape or form. All the other kingdoms or nations, the number of which they imagined might amount to 72, were scattered about in small islands, the biggest of which, according to their maps, was not so large as the least of the Chinese provinces. These were stuck round their empire, to which they gave a quadrangular form, like as many satellites, designed only to serve and adorn it. They indeed gave the preference to their four neighbouring kingdoms of Tartary, Japan, Ton-king, and Korea. The inhabitants of these, though reckoned barbarians, they still looked upon as considerably improved by their vicinity to China: but as to the rest, they were looked upon as outcasts into the extreme parts of the earth, and the refuse of nature; and as such they characterized them in their maps, marking them by such emblems as were most fit to inspire their nation with disdain and contempt. It was therefore no small matter of wonder to them, when, upon their becoming acquainted with the Europeans, they found them not only as polite and rational as themselves, but far superior to them in all kinds of learning. From that time they used to say that "the Chinese had two eyes, the Europeans one, and the rest of the world none at all."

When the country was first discovered by the Europeans, they were no less surprised at the ingenuity and politeness of the Chinese, than the latter were at the learning of the Europeans. The first traveller that we know of who visited China, was Fra. Paulo, more commonly known by the name of *Paulus Venetus*, about the end of the 13th century. At that time all Europe was immersed in such a state of barbarism, that the riches and polite behaviour of the Chinese could not but appear very extraordinary in his eyes. His accounts were not believed, but laughed at as a romance.

China.

52
Prodigious
industry of
the inhabi-
tants.

55
Extreme
pride of the
Chinese.

54
China when
first disco-
vered by
the Euro-
peans.

49
Empire to-
tally redu-
ced.

50
Christi-
anity
first encour-
aged and
then perse-
cuted.

51
Climate,
soil, &c. of
China.

romance. When the Portuguese discovered the famous country by sea, above 200 years ago, they were almost as much surprised as Paulus Venetus had been. Neither were their accounts credited, till the missionaries whom the pope kept pouring in since the year 1580 published so many accounts concerning the riches of China that they could no longer be denied. It must be owned, however, that the Chinese were vastly inferior to the Europeans in the liberal sciences; but, on the other hand, the former, to this day, as much exceed them in opulence, manufactures, handicrafts, agriculture, &c.

55
Incredible
numbers of
people.

Another advantage for which this country hath been famed, and in which it certainly exceeds every other in the world, is the vast number of its inhabitants. In most of the provinces, the cities, towns, and villages, are so thick crowded upon one another, that the whole seems to be almost a continued town. All of them swarm with inhabitants, every one employed in some manufacture, traffic, or work. Their roads are crowded with passengers night and day, with coaches, carriages, waggons, and sometimes whole caravans; all employed in carrying on some useful commerce, and in conveying all sorts of merchandizes, provisions, and other wares, from one end of the kingdom to the other. The number of armies, garrisons, and troops necessary for defending this vast empire, far exceed what is to be found in any other part of the world, and indeed are almost incredible. According to some Chinese registers, the whole number of males amounted to 59,788,364; at that time the army consisted of 902,054 foot, and 989,167 horse, besides 767,970 men kept in garrisons. For these, as well as for the accommodation of the mandarins and other officers of the court, there are reckoned 1145 inns or places of entertainment. In short, to speak in the style of one of their writers, "the Chinese empire is so immensely populous, that its inhabitants are not to be computed by thousands, but by millions." Many of these live entirely in vessels on the canals, keeping hogs, poultry, dogs, and other domestic animals, on board. Besides these vessels, there is a prodigious number of floats of timber which perpetually go up and down the canals and rivers, carrying whole villages of people upon them. Some of these floats are above a mile in length. The people build huts upon the floats, and live in them till they have disposed of their timber, which they sometimes carry 1000 miles.

56
Extreme
misery of
the great-
est part of
them.

From this description, it is natural to imagine that the Chinese must be the happiest nation in the whole world, and that poverty is scarce known among them; but the case is far otherwise. This empire exceeds other nations as much in the misery of many of its inhabitants, as it does in the number of them. This is in a great measure owing to the wickedness and corruption of their magistrates. Every province has its viceroy and several orders of mandarins, who are designed to serve as checks upon each other, and pervert the people from oppressing one another, or being oppressed by their governors. But the misfortune is, that they all find it their interest to wink at one another's crimes; and thus the people are oppressed to a degree beyond what they could be by any single governor however bad. The first class of mandarins

are the judges of courts, who determine civil and criminal causes; the next attend the affairs of the treasury and revenue; and the third command the militia. All these, according to the Chinese constitution, ought to keep their offices no longer than three years; and are never to be natives of the province where they officiate; lest, if they be of mean descent, they should be despised; or, if rich, should become too much respected and powerful. They are allowed sufficient salaries, that they may be enabled to discharge their offices, and administer justice without fees or bribery. Their palaces and places of residence are also provided for them at the expence of government, to prevent them from being too profuse in furniture, &c. But all these wise regulations they find means to elude; and there is not a nation on earth where extortion and fraud are carried to a greater height, or more universally diffused, than in China. Thus the court at Peking extorts vast sums from the viceroys of the provinces, and these again from the mandarins under them. The mandarins of course must fleece the inferior officers, and they again plunder the people, who having none below them whom they can oppress, are reduced to the necessity of cheating one another, or those foreigners who trade with them. In this they are so expert, that it is commonly said a Chinese will cheat a man of any other nation; but none can cheat a Chinese, except one of his own country.

The consequence of this extortion is manifest, in the misery to which the lower ranks of inhabitants are reduced in years of dearth: which sometimes happen through excessive drought, or the devastations of the grasshoppers; which, in some parts of the empire, at times, appear in such numbers, as not only to devour every herb, leaf, or fruit, but even the small wood of the branches, and fibres of the roots of trees. In these calamitous cases, the common people are often obliged to expose or destroy their children, sell them for slaves, and sometimes to rise in rebellion. Even in their most plentiful seasons, the poorer sort, notwithstanding all their art and industry, are glad to support themselves not only on the very refuse of every kind of provisions, but even on dogs and cats, though they die of old age or sickness, rats, mice, and other vermin; or on the garbage of any fowl, fish, or fowl, they can purchase; for these are sold in the markets as well as the more dainty meats; and there are cooks-shops where the entrails of fitches, fowls, &c. are dressed, and whither those who can afford no better are glad to repair.

57
Govern-
ment.

The government of China is monarchical, and in the highest degree despotic; and has been so from the earliest ages. Nay, so much were they inured to this kind of government, and so little notion had they of any other, that when the Dutch ambassador made his first application, he found it very difficult to make the court understand what he meant by the "High and mighty lords the states general, and the republic of Holland." Their laws are contained in some books which they call canonical; but their monarchs are the sole interpreters of them; so that we may say the whole legislative power is lodged in their breast, and depends entirely on their will.

The revenue of the emperor is computed at about 50,000,000

50,000,000 Sterling. Their punishments are either capital, as in cases of rebellion, murder, treason, &c. or corporal and pecuniary in lesser crimes. Rebellion and treason being esteemed the greatest of all possible crimes are punished with the greatest rigour, viz. by cutting the criminal into 10,000 pieces, in the following manner: the executioner, having first tied him to a stake, tears the skin off his head and forehead, and lets it hang over his eyes, to prevent him, according to some, from seeing how dreadfully the rest of his body is mangled. Then he proceeds to flay the other parts of his body with a kind of cutlase, till he hath almost cut all his flesh in pieces; and then abandons him to the populace, who commonly dispatch him in the same butcherly manner. This punishment, however, is seldom executed with such extreme rigour, unless under some cruel princes; for the law only directs the body of the criminal to be cut into several pieces, his belly ripped up, and his entrails taken out, after which the carcase is to be thrown into a ditch or river, as is commonly done to great malefactors.

Next to treason or rebellion against the emperor, that against parents is reckoned the greatest crime, and is punished with equal severity. In this case, if a father accuses a son before a magistrate, no further proof is required, but the criminal is immediately executed. This is done for mere obstinacy or disobedience; but if the offender hath proceeded so far as mockery, insult, or lifting a hand, the whole country is alarmed, and the punishment of the criminal reserved for the emperor himself. In this last case, the magistrates of the place are turned out with disgrace, and the whole neighbourhood is threatened with some severe punishment for having given birth to such a monster. The offender is then condemned to be cut like a traitor or rebel, into 10,000 pieces, and afterwards burnt; his lands, house, or houses, to be destroyed, and to remain so, as a monument of such a detestable crime.

Murder is also capital, and is punished either by beheading or strangling the criminal. The former of these is reckoned the most dishonourable; because, in that case, the head, which is the most honourable part, is separated from the body, and the person doth not go out of the world with the body intire, as when he came into it. Adultery is so far from being a capital crime in China, that some fond parents, out of compassion to their daughter's weakness, will contract with their future husbands, in consideration of some valuable present, to allow her the liberty of now and then indulging herself with a gallant, without being called to an account for it. But where no such contract hath been made, the husband may inflict a corporal punishment, or divorce a wife who proves unfaithful. Neither is theft capitally punished. Those who are guilty of it, are either condemned to the bastinado, that is, to receive such a number of blows with a cudgel on their backs or buttocks as the magistrate shall appoint. After this, if the offender is able, he must kneel down before him, and thank him for his kind correction; though one blow would be sufficient to lame a man, if the executioner was not bribed. When the theft is of a higher nature, the offender is condemned to the *kan-ghe*, or wooden

ruff. This is a kind of portable pillory, consisting of two pieces of wood hollowed out in the middle, so as to fit the neck of the offender, and of such a breadth, that the wearer can neither see his own feet, nor put his hand to his mouth, so that he must be beholden to some other person for his food. It is made lighter or heavier according to the nature of the crime, or the favour of the mandarin: the lightest are about 40 or 50 pounds weight, but many weigh much more; some even 200 pounds; and so troublesome and grievous are these collars, that the wearers often die. The time of wearing is likewise appointed by the mandarin; as also the place where it is to be worn. When the time is expired, the offender is brought back to the mandarin; and after a suitable admonition, and a sound drubbing, which begins and ends every punishment of this kind, he is released from his burden, and set at liberty.

There are two kinds of torture used in China, the ordinary and extraordinary. The first is inflicted by a kind of engine, which they clap on the hands or feet, or both; and which distorts the bones to such a degree that the ankles are sometimes squeezed quite flat by it. The extraordinary torture is seldom used, except in cases of treason or rebellion, in order to make the criminal discover his accomplices after the fact has been proved. It is inflicted by cutting slight gashes in the body, and stripping off the skin in narrow slips or fillets. One thing, however, must be said in praise of the Chinese, with regard to the treatment of their criminals, viz. that their prisons are much more capacious, airy, and sweet, than any of the European ones. They are generally large spacious courts, on whose four sides are the apartments of the criminals, raised upon wooden columns, in the form of a gallery; and on the four corners are secured the most notorious rogues, in strong cells and fetters. The women are confined in a separate court, and no man is admitted to come or even speak to them; except through a grate, or the turning-box, through which their victuals, and other necessities are conveyed.

As to their persons, the Chinese are generally of middling stature, broad faced, with black hair, small black eyes, short noses, and thin beards. This last circumstance is the effect of a very painful operation, viz. pulling up the greatest part of the beard by the roots with tweezers. Since the accession of the Tartar monarchs to the crown, they have forced the Chinese to cut off all their hair except a lock on the crown like the Mahometans. Near the tropic, their complexions incline to tawny; but in the northern part, they are as fair as other people under the same parallel. The women are esteemed for their little feet, which are reckoned their greatest beauty: and in order to form them little, they are bound up from their infancy so tight, that they cannot grow to the common size; the foot of a full grown woman not being bigger than that of a child of four years old. The men wear a cap of the shape of a bell on their heads, which does not cover their ears; they also wear a vest and sash, and over the vest a loose coat or gown, and a kind of silk boots quilted with cotton. In the southern provinces the inhabitants, when at home, throw off every

ry thing but a pair of drawers, and appear naked ; as the common people also do on the streets. The women dress with their hair down, having nothing on their heads, in the south. They generally wear a silk vest, red, blue, or green ; and over it a loose gown with white sleeves, and embroidered felt shoes ; but, by reason of the smallness of their feet, hobble prodigiously when they walk. Here, as in most other countries of the east, the married couple are brought together without any previous acquaintance with each other ; the bargain being struck by the parents, or by some go-between, and afterwards ratified by presents sent on both sides. There is scarce any country in the world where grief for the dead is manifested to such a degree, as in China, especially for near relations ; or where the mourning is so deep, and so long continued. Every Chinese keeps in his house a table whereon are written the names of his father, grandfather, and great-grandfather ; before which they frequently prostrate themselves ; and when the father of a family dies, the name of the great-grandfather is taken away, and that of the deceased added to make up the number.

61

Religion.

The Chinese are said to worship one supreme God along with several inferior deities, who appear to have been men eminent in several ages ; particularly the inventors of arts and sciences. There are at this day three sects in China. 1. The followers of La-lao-kun, who lived above 500 years before Christ. He taught that God was corporeal, and had many subordinate deities under his government. His disciples study magic, and pretend to make a drink that will confer immortality. The second is the sect of the learned, or disciples of Confucius. He left many admirable precepts in morality, and instructed the people in philosophy. He speaks of God as a most pure and perfect principle, and the fountain and essence of all beings. Though we are told that he prohibited idolatry, he has temples and images erected to him, and is worshipped with the most profound veneration ; as appears from the pope's decree against the Jesuits, for indulging their converts in this idolatrous worship. The third sect, which is that of the idol Fo, or Fo-hi, is much more numerous than either of the former. They style him the only saviour of the world. His priests, the bonzes, teach several moral precepts, and a state of rewards and punishments after this life. The punishments consist chiefly in animating some vermin, or beast of burden after death. They forbid the drinking of wine ; and do not forget to instruct their followers how much it is their duty to entertain and nourish their priests, and to build them temples and monasteries, and perform the penances they enjoin. If these things are neglected, they threaten them with the most unhappy transfigurations. The Chinese have also an image of immortality, which they worship under the shape of a monstrous fat man sitting cross-legged, with a huge prominent belly. There is another called the *Idol of Pleasure*, about 20 feet high ; and between these, in their temples is an image 30 feet high, gilded over, with a crown upon his head, and richly dressed. The Christian religion, we are told, was planted in this country, either by the apostle Thomas, or some of his disciples. The Chinese re-

cords seem to intimate that a man came there about that time, who preached a heavenly doctrine, and confirmed it by miracles. There is also an ancient marble pillar erected in the province of Shen-si, in memory of a man that brought Christianity thither in the year 636. However, the missionaries of the church of Rome did not find, as we are told, the least vestige of Christianity on their arrival in China.

62

Learning.

The learning of the Chinese is, in a great measure, confined to the study of their own language. Their characters are a kind of short-hand, every one of which signifies a word or sentence. There are near 60,000 of these characters in all, but those in common use do not exceed 3000. This vast number of characters, however, is reducible to a pure and simple alphabet like those of any other language : for a character is no more than a word written with its proper consonants and vowels ; not indeed at length as we do, but intermingled one with another by some peculiar method known only to them, or perhaps only to their learned men. They write from the top to the bottom of the page. In all other respects the knowledge and learning of the Chinese are very limited. Some knowledge of astronomy they certainly had ; but that was exceedingly defective. They are said indeed to have calculated the eclipses of the sun and moon for a vast number of years ; but many of these calculations have been found by the Europeans who visited them to be false and erroneous, and whatever progress they have made in that or other sciences must be attributed entirely to the Jesuit missionaries. They are, however, in some things a very ingenious people. The art of printing they have had from time immemorial. It is true, this is only performed by wooden blocks in the same manner as cards are done among us ; but the vast number of their characters renders it impossible to bring that art to the same perfection which it hath attained in Europe. Their chief commodities are, silk, cotton, tea, china-ware, and cabinets or lacquered-ware. Their silks are exceedingly fine ; their atlas's, gold and silver stuffs, are not to be paralleled ; but their porcelain is thought to be equalled or even excelled by that of Dresden, and their lacquered-ware is greatly excelled by that of Japan. In hard-ware the Europeans excel them prodigiously ; the Chinese being mere bunglers at making clocks, watches, door and gun-locks, &c. They had the use of gun-powder, and of the mariner's compass, for many centuries before they were known in Europe ; but through a neglect unaccountable in such an ingenious people they scarce reaped one single advantage either from the one or the other.

63

Navigation.

The Chinese had no traffic with other nations, except those in their neighbourhood, till the Portuguese discovered their country by the way of the Cape of Good Hope. Their junks, as they are called, are many of them 1000 tons burthen, heavy sailers, with square heads and stems. Some of them have two masts, others three, but never any top-masts ; and their sails are made of matting, which they let down upon the deck when they furled them. The hold of the ship is divided into many small partitions, which are made so tight, that if a leak happens in one of them it goes no further, and the goods stowed in the other partitions

China-root
I
Chio.

partitions receive no damage. The compilers of the Universal History take notice, that the Chinese vessels are built according to the proportions of Noah's ark; viz. six breadths to a length: and this they will have to be a proof that the Chinese empire was founded by Noah. They have no coin throughout the whole empire, except a copper one of very little value. Their merchandize is bought with gold and silver cut for the purpose, from ingots or plates. The former is of less value in China than in most other nations; and therefore silver is advantageously exchanged by the Europeans for that precious metal.

CHINA-Root, in the materia medica, the root of a species of *SMILAX*, brought both from the East and West Indies; and thence distinguished into oriental and occidental. Both sorts are lengthy, full of joints, of a pale-reddish colour, with no smell, and very little taste. The oriental, which is the most esteemed, is considerably harder and paler-coloured than the other. Such should be chosen as is fresh, close, heavy, and upon being chewed appears full of a fat unctuous juice. It is generally supposed to promote insensible perspiration and the urinary discharge, and by its unctuous quality to obtund acrimonious juices. China-root was first brought into Europe in the year 1535, and used as a specific against venereal and cutaneous disorders. With this view it was made use of for some time; but has long since given place to more powerful medicines.

CHINA-Ware. See **PORCELAIN**.

CHINCA, a sea-port town of Peru in South America, situated in an extensive valley of the same name, in W. Long. 76. o. S. Lat. 13. o.

CHIN-COUGH, a convulsive kind of cough to which children are generally subject. See (the *Index* subjoined to) **MEDICINE**.

CHINESE, in general denotes any thing belonging to China, or its inhabitants.

CHINESE Swanpan. See **SWANPAN**.

CHINKAPIN. See **FAGUS**.

CHINON, an ancient town of Tourain in France, remarkable for the death of Henry II. king of England, and for the birth of the famous Rabelais. It is seated on the river Vienne, in a fertile and pleasant country, in E. Long. o. 18. N. Lat. 47. 2.

CHIO, or **CHIOS**, an Asiatic island lying near the coast of Natolia, opposite to the peninsula of Ionia. It was known to the ancients by the name of *Æthalia*, *Macris*, *Pithyusa*, &c. as well as that of Chios. According to Herodotus, the island of Chios was peopled originally from Ionia. It was at first governed by kings, but afterwards the government assumed a republican form; which, by the direction of Isocrates, was modelled after that of Athens. They were, however, soon enslaved by tyrants, and afterwards conquered by Cyrus king of Persia. They joined the other Grecians in the Ionian revolt; but were shamefully abandoned by the Samians, Lesbians, and others of their allies; so that they were again reduced under the yoke of the Persians, who treated them with the utmost severity. They continued subject to them till the battle of Mycale, when they were restored to their ancient liberty, which they enjoyed till the downfall of the Persian empire, when they became

Chionanthus
I
Chirographer

subject to the Macedonian princes. In the time of the emperor Vespasian the island was reduced to the form of a Roman province; but the inhabitants were allowed to live according to their own laws under the superintendence of a prætor. It is now subject to the Turks; and is called *Scio*; see that article.

CHIONANTHUS, the **SNOW-DROP TREE**; a genus of the monogynia order, belonging to the dianthia class of plants. There is but one species particularly described by botanists, viz. the *Virginica* or *fringe-tree*. It is common in Virginia and South Carolina, where it grows by the sides of rivulets. It rises to the height of ten feet; the leaves are as large as those of the laurel, but much thinner. The flowers come out in May, and are of a pure white; from whence it has the name of the *snow-drop tree*. They hang down in large branches, and are cut into narrow segments; from which it has got its other name of the *fringe-tree*. After the flowers are fallen off, the fruit appears, which grows to the size of a sloe, having a stone in the middle. The plants are propagated from seeds sown on a hot-bed, and kept in a stove. Some have been raised from layers; but this method is very precarious, and therefore the other is to be preferred. The seeds must be procured from America, for they never come to perfection in this country.

CHIOURLIC, an ancient town of Turkey in Europe, and in Romania, with a see of a Greek bishop. It is seated on a river of the same name, in E. Long. 7. 47. N. Lat. 41. 18.

CHIOZZO, an ancient and handsome town of Italy, in the territory of Venice, and in a small island, near the Lagoon, with a podestà, a bishop's see, and a harbour defended by a fort. E. Long. 12. 23. N. Lat. 45. 17.

CHIPPENHAM, a town of Wiltshire, seated on the river Avon. It is a good thorough-fare town; has a handsome stone-bridge over the river, consisting of 16 arches; and sends two members to parliament. W. Long. 2. 12. N. Lat. 51. 25.

CHIROGRAPH, was anciently a deed which, requiring a counterpart, was engrossed twice on the same piece of parchment, counterwise; leaving a space between, wherein was wrote **CHIROGRAPH**; through the middle whereof the parchment was cut, sometimes straight, sometimes indentedly; and a moiety given to each of the parties. This was afterwards called *dividenda*, and *charta divisæ*; and was the same with what we now call *charter-party*. See **CHARTER-Party**. The first use of these chirographs with us, was in the time of Henry III.

CHIROGRAPH was also anciently used for a fine: and the manner of engrossing the fines, and cutting the parchment in two pieces, is still retained in the office called the *chirographer's office*.

CHIROGRAPHER of **FINES**, an officer in the common pleas, who engrosses **FINES** acknowledged in that court, into a perpetual record, (after they have been examined, and passed by other officers;) and writes and delivers the indentures thereof to the party. He makes two indentures; one for the buyer, the other for the seller; and a third indented piece, containing the effect of the fine, and called the *foot of the fine*; and delivers it to the *custos brevium*.—The

same

Chiromancy.
Chiron.

same officer also, or his deputy, proclaims all fines in court every term, and endorses the proclamations on the backside of the foot; keeping, withal, the writ of covenant, and the note of the fine.

CHIROMANCY, a species of divination drawn from the lines and lineaments of a person's hand; by which means, it is pretended, the dispositions may be discovered. See **DIVINATION**, n° 9.

CHIRON, a famous personage of antiquity; styled by Plutarch, in his dialogue on music, "*The wife Centaur*." Sir Isaac Newton places his birth in the first age after Deucalion's deluge, commonly called the *Golden Age*; and adds, that he formed the constellations for the use of the Argonauts, when he was 88 years old; for he was a practical astronomer, as well as his daughter Hippo: he may, therefore, be said to have flourished in the earliest ages of Greece, as he preceded the conquest of the Golden Fleece, and the Trojan war. He is generally called the son of Saturn and Philyra; and is said to have been born in Thesfaly among the **CENTAURS**, who were the first Greeks that had acquired the art of breaking and riding horses: whence the poets, painters, and sculptors, have represented them as a compound of man and horse; and perhaps it was at first imagined by the Greeks, as well as the Americans, when they first saw cavalry, that the horse and the rider constituted the same animal.

Chiron was represented by the ancients as one of the first inventors of medicine, botany, and *chirurgery*; a word which some etymologists have derived from his name. He inhabited a grotto or cave in the foot of Mount Pelion, which, from his wisdom and great knowledge of all kinds, became the most famous and frequented school throughout Greece. Almost all the heroes of his time were fond of receiving his instructions; and Xenophon, who enumerates them, names the following illustrious personages among his disciples: Cephalus, Æsculapius, Melanion, Nestor, Amphiaræus, Peleus, Telamon, Meleager, Theseus, Hippolitus, Palamedes, Ulysses, Menestheus, Diomedes, Castor and Pollux, Machaon and Podalirius, Antilochus, Æneas, and Achilles. From this catalogue it appears, that Chiron frequently instructed both fathers and sons; and Xenophon has given a short eulogium on each, which may be read in his works, and which redounds to the honour of the preceptor. The Greek historian, however, has omitted naming several of his scholars, such as Bacchus, Phœnix, Cocytus, Arylæus, Jason, and his son Medeus, Ajax, and Protefilaus. Of these we shall only take notice of such as interest Chiron more particularly. It is pretended that the Grecian Bacchus was the favourite scholar of the Centaur: that he learned of this master the revels, orgies, bacchanalia, and other ceremonies of his worship. According to Plutarch, it was likewise at the school of Chiron that Hercules studied music, medicine, and justice; though Diodorus Siculus tells us, that Linus was the music-master of this hero. But among all the heroes who have been disciples of this Centaur, no one reflected so much honour upon him as Achilles, whose renown he in some measure shared; and to whose education he in a particular manner attended, being his grandfather by the mother's side. Apollo-

Burney's
Hist. of
Music.

dorus tells us, that the study of music employed a considerable part of the time which he bestowed upon his young pupil, as an incitement to virtuous actions, and a bridle to the impetuosity of his temper. One of the best remains of antique painting now existing, is a picture upon this subject, dug out of the ruins of Herculanæum, in which Chiron is teaching the young Achilles to play on the lyre. The death of this philosophic musician was occasioned, at an extreme old age, by an accidental wound in the knee with a poisoned arrow, shot by his scholar Hercules at another. He was placed after his death by Mæzus among the constellations, through respect for his virtues, and in gratitude for the great services which he had rendered the people of Greece. Sir Isaac Newton says*, * *Chronol.* p. 151. in proof of the constellations being formed by Chiron and Mæzus for the use and honour of the Argonauts, that nothing later than the expedition was delineated on the sphere; according to the same author, Chiron lived till after the Argonautic expedition, in which he had two grandsons. The ancients have not failed to attribute to him several writings; among which, according to Suidas, are *precepts*, *υποθεσεις*, in verse, composed for the use of Achilles; and a medicinal treatise on the *diseases incident to horses* and other quadrupeds, *ἰαματρικος*; the lexicographer even pretends, that it is from this work the Centaur derived his name. Fabricius gives a list of the works attributed to Chiron, and discusses the claims which have been made for others to the same writings; and in vol. xiii. he gives him a distinguished place in his catalogue of ancient physicians.

CHIRONIA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants. There are eight species, of which the *fruticosa* is the most remarkable. It is a native of the Cape of Good Hope. The root is fibrous, and spreads near the surface of the ground. The stalks are round, and inclining to be ligneous, but are of a very soft texture; these rise from two to three feet high, sending out several branches which grow erect, and are garnished with succulent leaves an inch or more in length, and about an eighth of an inch in breadth. At the end of each shoot the flowers are produced, which are tubulous, and spread open at the top; they are of a bright red colour; and when there are a large number of flowers open on the same plant, they make a fine appearance. The flowers are produced from June to autumn; and the seeds ripen in October. The plants are propagated by seeds, which must be sown in pots filled with light sandy earth, and plunged in a moderate hot-bed. In summer they may be inured to the open air; but must always be sheltered in winter.

CHIRONOMY, in antiquity, the art of representing any past transaction by the gestures of the body, more especially by the motions of the hands: this made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIROTONY, among ecclesiastical writers, denotes the imposition of hands used in conferring priestly orders. However, it is proper to remark, that chirotony originally was a method of electing magistrates, by holding up the hands.

Chironia
Chirotony.

CHIRURGEON,

CHIRURGEON, or SURGEON. See SURGEON. CHIRURGERY. See SURGERY. CHISLEY-LAND, in agriculture, a soil of a middle nature between sandy and clayey land, with a large admixture of pebbles.

CHISEL, a well known instrument much used in carpentry, masonry, joinery, sculpture, &c.

CHITAU, in the materia medica, a kind of lignum aloes. See LIGNUM Aloes.

CHITON, in zoology, a genus of the order of vermes testacea. The name *chiton* is from *χiton*, *Corica*, a coat of mail. The shell is plated, and consists of many parts lying upon each other transversely: the inhabitant is a species of the DORIS. They are common on the shores of Scarborough, Aberdeen, and Lochbroom. See several species represented of their natural size on Plate LXXIV.

CHITTRICK'S MEDICINE for the STONE. This medicine was some years ago kept as a secret, and had great reputation as a lithontriptic, which indeed it seems in many cases to deserve. It was discovered by Dr Blackrie to be no other than soap-lye, and the following receipt for using it was procured by General Dunbar: "Take one tea-spoonful of the strongest soap-lye, mixed in two table-spoonfuls of sweet milk, an hour before breakfast, and at going to bed. Before you take the medicine take a sup of pure milk, and immediately after you have swallowed the medicine take another. If you find this agrees with you for two or three days, you may add half as much more to the dose."

CHIVALRY, in law, is used for a tenure of lands by knight's service; whereby the knight was bound to perform service in war unto the king, or the mesne lord of whom he held by that tenure. And chivalry was either general or special: *general*, when it was only in the feoffment that the tenant held *per servitium militare*, without any specification of sergeantry, escuage, &c.; *special*, when it was declared particularly by what kind of knight-service the land was held.

For the better understanding of this tenure it hath been observed, that there is no law but is holden immediately or immediately of the crown by some service; and therefore all freeholds that are to us and our heirs, are called *feuda*, or *feoda*, "fees;" as proceeding from the king for some small yearly rent, and the performance of such services were originally laid upon the land at the donation thereof. For as the king gave to the great nobles, his immediate tenants, large possessions forever, to hold of him for this or that service or rent; so they, in time, parcelled out to such others as they liked, the same lands for rents and services as they thought good: and these services were, by Littleton, divided into two kinds, *chivalry* and *sovcage*; the first whereof was martial and military, the other rustic. Chivalry, therefore, was a tenure of service, whereby the tenant was obliged to perform some noble or military office unto his lord: and it was of two kinds; either *regal*, that is, held only of the king; or *common*, where held of a common person. That which might be held only of the king was called *servitium*, or *sergeantia*; and was again divided into *grand* and *petit* serjeanty. The grand serjeanty was

where one held lands of the king by service, which he ought to do in his own person; as, to bear the king's banner or spear, to lead his host, to find men at arms to fight, &c. *Petit* serjeanty was when a man held lands of the king, to yield him annually some small thing towards his wars, as a sword, dagger, bow, &c. Chivalry that might be holden of a common person was termed *scutagium*, "escuage;" that is, service of the shield; which was either uncertain or certain.

Escuage uncertain, was likewise two-fold: first, where the tenant was bound to follow his lord, going in person to the king's wars, either himself, or sending a sufficient man in his place, there to be maintained at his expence, so long as was agreed upon between the lord and his first tenant at the granting of the fee; and the days of such service seem to have been rated by the quantity of land so holden: as, if it extended to a whole knight's fee, then the tenant was to follow his lord 40 days; and if but to half a knight's fee, then 20 days; if a fourth part, then 10 days, &c. The other kind of this escuage was called *castle-ward*, where the tenant was obliged, by himself or some other, to defend a castle as often as it should come to his turn. And these were called *escuage uncertain*; because it was uncertain how often a man should be called to follow his lord to the wars, or to defend a castle, and what his charge would be therein.

Escuage certain, was where the tenure was set at a certain sum of money to be paid in lieu of such service; as that a man should pay yearly for every knight's fee 20 s.; for half a knight's fee 10 s. or some like rate; and this service, because it is drawn to a certain rent, groweth to be of a mixed nature, not merely focage, and yet focage in effect, being now neither personal service nor uncertain. The tenure called chivalry had other conditions annexed to it: but there is a great alteration made in these things by the stat. 12. Car. 2. c. 24. whereby tenures by knight's service of the king, or any other person in capite, &c. and the fruits and consequences thereof, are taken away and discharged; and all tenures are to be construed and adjudged to be free and common focage, &c.

CHIVALRY, properly so called, and, under the idea of a distinct military order, conferred in the way of investiture, and accompanied with the solemnity of an oath, and other ceremonies, as described in the old historians and romances, seems to have sprung immediately out of the *feudal constitution*.

The first and most sensible effect of this constitution was the erection of a great number of petty tyrannies. For the power given by it to the barons over their numerous vassals was so great, that they all were in truth a sort of absolute sovereigns, at least with regard to one another. Hence, their mutual arms and interests often interfering, the feudal state was, in a good degree, a state of war; and their castles were so many fortresses, as well as palaces. In this state of things, all imaginable encouragement was to be given to the use of arms. And this condition of the times gave rise to that military institution which we know by the name of *chivalry*. Further, military discipline was not to be relaxed even in the intervals of peace.

Origin of
chivalry.

Chivalry. peace. Hence the origin of jousts and tournaments, those images of war. Chivalry was the natural, and even sober, effect of the feudal policy.

Character- The conjecture of the rise of chivalry, from the istics and genius of Chivalry. circumstances of the feudal government, accounts for the several characteristics of this singular profession.

1. The passion for arms; the spirit of enterprise; the honour of knighthood; the rewards of valour, ambition, interest, glory, all concurred, under such circumstances, to produce these effects. When this turn was given to the thoughts and passions of men, life and fashion would do the rest, and carry them to all the excesses of military fanaticism. One of the strangest circumstances in the old romances, and which looks most like a mere extravagance of the imagination, is that of the *women-warriors*; yet in this they did but copy from the manners of the times.

2. Their romantic ideas of justice; their passion for adventures; their eagerness to run to succour the distressed; and the pride they took in redressing wrongs, and removing grievances. The feudal state being a state of almost perpetual violence, rapine, and plunder, it was unavoidable that numbers of the tenants or followers of one baron should be carried away by the followers of another: and the interest each had to protect his own, would, of course, introduce the point of honour in attempting, by all means, not only to retaliate on the enemy, but to rescue the captive sufferers out of the hands of their oppressors. It would be meritorious in the highest degree to fly to their assistance, when they knew where they were to be come at; or to seek them out with diligence, when they did not. This last service they called *going in quest of adventures*; which at first, no doubt, was confined to those of their own party, but afterwards, by the habit of acting on this principle, would be extended much further. So that, in process of time, we find the knights-errant, as they were now properly styled, wandering the world over in search of occasions on which to exercise their generous and disinterested valour.

3. The courtesy, affability, and gallantry, for which these adventurers were so famous, are but the natural effects and consequences of their situation. For the castles of the barons were the courts of these little sovereigns, as well as their fortresses: the resort of their vassals thither, in honour of their chiefs, and for their own proper security, would make that civility and politeness which is seen at courts, and insensibly prevails there, a predominant part in the character of these assemblies. Further, the free commerce of the ladies, in these knots and circles of the great, would operate so far on the sturdiest knights as to give birth to the attentions of gallantry.

4. It only remains to account for that character of religion, which was so deeply imprinted on the minds of these knights, and was essential to their institution. Two reasons are assigned for this singularity. First, the superstition of the times, which was so great, that no institution of a public nature could have found credit that was not consecrated by churchmen and interwoven with religion. Secondly, the condition of the Christian world; which had but just recovered a breath-

ing time from the brutal ravages of the Saracen armies. The remembrance of what they had lately suffered from these enemies of their faith, made it natural and even necessary to engage a new military order on the side of religion. And here, by the way, the reason appears why the Spaniards, of all the Europeans, were furthest gone in every characteristic madness of true chivalry. Their fanaticism in every way was especially inflamed and kept alive by the memory and neighbourhood of their infidel invaders.

Such was the state of things in the western world, when the crusades to the holy land were set on foot. Whence we see how well prepared the minds of men were for engaging in that enterprise.

THERE is a remarkable correspondence between the manners of the old heroic times, as painted by their great romancer Homer, and those which are represented to us in the modern books of knight-errantry. A fact of which no good account can be given, but by another not less certain; that the political states of Greece, in the earliest periods of its story, was similar, in many respects, to that of Europe, as broken by the feudal system, into an infinite number of petty independent governments.

Some obvious circumstances of agreement between the heroic and Gothic manners may be worth putting down.

1. The military enthusiasm of the barons, is but of a piece with the fanaticism of the heroes. Hence the same particularity of description in the accounts of battles, wounds, deaths, in the Greek poet, as in the Gothic romancers. Hence that minute curiosity in the display of their dresses, arms, accoutrements. The minds of all men being occupied with warlike images and ideas, were much gratified by those details, which appear cold and uninteresting to modern readers.

We hear much of knights-errant encountering giants, and quelling savages, in books of chivalry. These giants were oppressive feudal lords, and every lord was to be met with, like the giant, in his strong-hold or castle. Their dependents of a lower form, who imitated the violence of their superiors, and had not their castles but lurking places, were the savages of romance. The greater lord was called a giant for his power; the less, a savage, for his brutality.

- Another terror of the Gothic ages, was monsters, dragons, and serpents. Their stories were received in those days for several reasons: 1. From the vulgar belief of enchantments: 2. From their being reported on the faith of eastern tradition, by adventurers from the holy land: 3. In still later times from the strange things told and believed on the discovery of the new world.

In all these respects, Greek antiquity resembles the Gothic. For what are Homer's *Læstrigons* and *Cyclops*, but bands of lawless savages, with each of them a giant of enormous size at their head? And what are the Grecian *Bacchus*, *Hercules*, and *Theſeus*, but knights-errant, the exact counterparts of Sir Launcelot, and Amadis de Gaul?

3. The oppressions which it was the glory of the knights to avenge, were frequently carried on, as we are told, by the *charms and enchantments of women*. These charms, we may suppose, are often metapho-

Chivalry.

The resemblance between the heroic and Gothic manners.

rical;

Chivalry. rical ; as expressing only the blandishments of the sex. Sometimes they are taken to be real, the ignorance of those ages acquiescing in such conceits. And are not these stories matched by those of Calypso and Circe, the enchantresses of the Greek Poet ?

4. Robbery and Piracy were honourable in both : so far were they from reflecting any discredit on the ancient or modern *redressers of wrongs*. What account can be given of this, but that, in the feudal times, and in the early days of Greece, when government was weak, and unable to redress the injuries of petty sovereigns, it would be glorious for private adventurers to undertake this work ; and, if they could accomplish it in no other way, to pay them in kind by downright plunder and rapine ?

5. Balthard was in credit with both. They were extremely watchful over the chastity of their own women ; but such as they could seize upon in the enemies quarter, were lawful prize. Or if, at any time, they transgressed in this sort at home, the fault was covered by an ingenious fiction. The offspring was reputed divine. Their greatest heroes were the fruit of goddesses approached by mortals ; just as we hear of the doughtiest knights being born of fairies.

6. With the greatest fierceness and savageness of character, the utmost generosity, hospitality, and courtesy, was imputed to the heroic ages. Achilles was at once the most relentless, vindictive, implacable, and the friendliest of men. We have the very same representation in the Gothic romances. As in those lawless times, dangers and distresses of all kinds abounded, there would be the same demand for compassion, gentleness, and generous attachments to the unfortunate, those especially of their own clan, as of resentment, rage, and animosity against their enemies.

7. Again, the martial games celebrated in ancient Greece, on great and solemn occasions, had the same origin and the same purpose as the tournaments of the Gothic warriors.

8. Lastly, the passions for adventures so natural in their situation, would be as naturally attended with the love of praise and glory. Hence the same encouragement, in the old Greek and Gothic times, to page-yrists and poets. In the affairs of religion and gallantry, indeed, the resemblance between the hero and the knight is not so striking. But the religious character of the knight was an accident of the times, and no proper effect of his civil condition. And that his devotion for the fair sex should so far surpass that of the hero, is a confirmation of the system here advanced. For the consideration had of the females in the feudal constitution, will of itself account for this difference. It made them capable of succeeding to fiefs, as well as the men. And does not one see, on the instant, what respect and dependence this privilege would draw upon them ?

It was of mighty consequence who should obtain the favour of a rich heiress. And though, in the strict feudal times, she was supposed to be in the power and at the disposal of her superior lord, yet this rigid state of things did not last long. Hence we find some distressed damsel was the spring and mover of every knight's adventure. She was to be rescued by his arms, or won by the fame and admiration of his prow-

els. The plain meaning of all which was this : That as, in these turbulent times, a protector was necessary to the weakness of the sex, so the courteous and valorous knight was to approve himself fully qualified for that purpose.

It may be observed, that the two poems of Homer were intended to expose the mischiefs and inconveniences arising from the political state of Old Greece : the *Iliad*, the dissensions that naturally spring up among independent chiefs ; and the *Odyssey*, the influence of their greater subjects, more especially when unrestrained by the presence of their sovereign. And can any thing more exactly resemble the condition of the feudal times, when, on occasion of any great enterprise, as that of the crusades, the designs of the confederate Christian states were perpetually frustrated, or interrupted at least, by the dissensions of their leaders ; and their affairs at home, as perpetually distressed and disordered by the rebellious usurpations of their greater vassals ? Jerusalem was to the European, what Troy had been to the Grecian princes.

Court of CHIVALRY, a court formerly held before the lord high constable and earl marshal of England jointly, and having both civil and criminal jurisdiction : but since the attainder of Stafford duke of Buckingham under Henry VIII. and the consequent extinguishment of the office of lord high constable, it hath usually, with respect to civil matters, been heard before the earl marshal only. This court by stat. 13. Ric. II. c. 2. hath cognizance of contracts and other matters, touching deeds of arms and war, as well out of the realm as in it. And from its sentences lies an immediate appeal to the king in person. This court was in great reputation in the times of pure chivalry, and afterwards during the English connexions with the continent, by the territories which their princes held in France : but is now grown almost entirely out of use, on account of the feebleness of its jurisdiction, and want of power to enforce its judgments ; as it can neither fine nor imprison, not being a court of record.

1. The *civil* jurisdiction of this court of chivalry, is principally in two points ; the redressing injuries of honour ; and correcting encroachments in matters of coat-armour, precedence, and other distinctions of families. As a court of honour, it is to give satisfaction to all such as are aggrieved in that point ; a point of a nature so nice and delicate, that its wrongs and injuries escape the notice of the common law, and yet are fit to be redressed somewhere. Such, for instance, as calling a man a *coward*, or giving him the lie ; for which, as they are productive of no immediate damage to his person or property, no action will lie in the courts at Westminster : and yet they are such injuries as will prompt every man of spirit to demand some honourable amends ; which, by the ancient law of the land, was given in the court of chivalry. But modern resolutions have determined, that how much soever a jurisdiction may be expedient, yet no action for words will at present lie therein. And it hath always been most clearly holden, that as this court cannot meddle with any thing determinable by common law, it therefore can give no pecuniary satisfaction or damages ; in as much as the quantity and determination

Chivalry
Chium.

determination thereof is ever of common law cognizance. And therefore this court of chivalry can at most order reparation in point of honour; as, to compel the defendant *mendacium sibi ipsi imponere*, or to take the lie that he has given upon himself, or to make such other submission as the laws of honour may require. As to the other point of its civil jurisdiction, the redressing of usurpations and encroachments in matters of heraldry and coat-armour; it is the business of this court, according to Sir Matthew Hale, to adjust the right and armorial ensigns, bearings, crests, supporters, pennons, &c.; and also rights of places or precedence, where the king's patent or act of parliament, which cannot be over-ruled by this court, have not already determined it. The proceedings of this court are by petition in a summary way: and the trial not by a jury of twelve men, but by witnesses, or by combat. But, as it cannot imprison, not being a court of record; and as, by the resolutions of the superior courts, it is now confined to so narrow and restrained a jurisdiction; it has fallen into contempt. The marshalling of coat-armour, which was formerly the pride and study of all the best families in the kingdom, is now greatly disregarded; and has fallen into the hands of certain officers and attendants upon this court, called *heralds*, who consider it only as a matter of lucre, and not of justice: whereby such falsity and confusion have crept into their records, (which ought to be the standing evidence of families, descents, and coat-armour), that though formerly some credit has been paid to their testimony, now, even their common seal will not be received as evidence in any court of justice in the kingdom. But their original visitation books, compiled when progresses were solemnly and regularly made into every part of the kingdom, to inquire into the state of families, and to register such marriages and descents as were verified to them upon oath, are allowed to be good evidence of pedigrees.

2. As a criminal court, when held before the lord high constable of England jointly with the earl Marshal, it had jurisdiction over pleas of life and member, arising in matters of arms and deeds of war, as well out of the realm as within it. But the criminal, as well as civil part of its authority, is fallen into entire disuse: there having been no permanent high constable of England, (but only *pro hac vice*, at coronations and the like), since the attainder and execution of Stafford duke of Buckingham, in the 13th year of Henry VIII.; the authority and charge, both in war and peace, being deemed too ample for a subject; so ample, that when the chief justice Fineux was asked by king Henry VIII. how far they extended? he declined answering; and said, the decision of that question belonged to the law of arms, and not to the law of England.

CHIVES, in botany, are slender thread-like substances, generally placed within the blossom, and surrounding the POINTALS. They are formed of the woody substance of the plant.

CHIUM MARMOR, in the natural history of the ancients, the name of a black marble, called also the *Lapis obsidianus*. It is very hard, and of a fine black; and, beside the many uses which the ancients put it to,

is well known among our goldsmiths by the name of the touch-stone; most of them being furnished with nothing better for that purpose than a piece of this: though the basalt, which might be had plentifully enough, is greatly preferable for those uses; any black marble, however, that is tolerably hard, will do. There is a very fine and elegantly smooth marble, of a compact texture, and fine glossy black, but shewing no glittering particles when fresh broken, as most of the black marbles do. It is extremely hard, and cuts with difficulty, but is capable of the highest polish of any marble. The ancients had it from Ethiopia and the island of Chios; we have it from Italy.

CHIUM VINUM, Chian wine, or wine of the growth of the island of Chios, now Scio, is commended by Dioscorides, as affording good nourishment, fit to drink, less disposed to intoxicate, endued with the virtue of restraining fluxions, and a proper ingredient in ophthalmic medicines. Hence Scribonius Largus directs the dry ingredients in collyria for the eyes to be made up with Chian wine.

CHLAMYS, in antiquity, a military habit worn by the ancients over the Tunica. It belonged to the patricians; and was the same in the time of war, that the toga was in the time of peace. This sort of gown was called *palla*, from the rich embroidery with figures in Phrygian work; and *purpurea*, because the ground-work was purple. The chlamydes of the emperors were all purple, adorned with a golden and embroidered border.

CHLOROSIS, in Medicine, a disease, commonly called the *green-sickness*, incident to young girls. See (the ENIGMA subjoined to) MEDICINE.

CHOCOLATE, in commerce, a kind of paste, or cake, prepared of certain ingredients, the basis of which is cacao. See CACAO.

The Indians, in their first making of chocolate, used to roast the cacao in earthen pots; and having afterwards cleared it of the husks, and bruised it between two stones, they made it into cakes with their hands. The Spaniards improved this method: when the cacao is properly roasted, and well cleaned, they pound it in a mortar, to reduce it into a coarse mass, which they afterwards grind on a stone till it be of the utmost fineness: the paste being sufficiently ground, is put quite hot into tin moulds, in which it coagels in a very little time. The form of these moulds is arbitrary: the cylindrical ones, holding two or three pounds, are the most proper; because the bigger the cakes are, the longer they will keep. Observe, that these cakes are very liable to take any good or bad scent, and therefore they must be carefully wrapt up in paper, and kept in a dry place. Complaints are made, that the Spaniards mix with the cacao nuts too great a quantity of cloves and cinnamon, besides other drugs without number, as musk, ambergrease, &c. The grocers of Paris use few or none of these ingredients: they only chuse the best nuts, which are called *caracas*, from the place from whence they are brought; and with these they mix a very small quantity of cinnamon, the sweetest vanilla, and the finest sugar, but very seldom any cloves. In England, the chocolate is made of the simple cacao, excepting that sometimes sugar and sometimes vanilla is added.

Chium
Chocolate.

Chocolate

Chocolate
|
Chondropterygii.

Chop
|
Chord.

Chocolate ready made, and cacao paste, are prohibited to be imported from any part beyond the seas. If made and sold in Great Britain, it pays inland-duty 1 s. 6 d. *per lb.* avoidupoise: it must be inclosed in papers containing one pound each, and produced at the excise-office to be stamped. Upon three days notice given to the officer of excise, private families may make chocolate for their own use, provided no less than half an hundred weight of nuts be made at one time.

The chocolate made in Portugal and Spain is not near so well prepared as the English; depending perhaps on the machine employed there, *viz.* the double cylinder, which seems very well calculated for exact triture. If perfectly prepared, no oil appears on the solution. London chocolate gives up no oil like the foreign; and it also may, in some measure, depend on the thickness of the preparation. The solution requires more care than is commonly imagined. It is proper to break it down, and dissolve it thoroughly in cold water by milling it with the chocolate stick. If heat is applied, it should be done slowly: for, if suddenly, the heat will not only coagulate it, but separate the oil; and therefore much boiling after it is dissolved, is hurtful. Chocolate is commonly required by people of weak stomachs; but often rejected for want of proper preparation. When properly prepared, it is easily dissolved; and an excellent food where a liquid nutrient vegetable one is required, and is less flatulent than any of the farinacea.

CHOCOLATE-*Nut Tree*. See CACAO.

CHOENIX, *γωνίς*, an ancient dry measure, containing the 48th part of a *medimnus*, or six bushels.

CHOIR, that part of the church or cathedral where choiristers sing divine service; it is separated from the chancel where the communion is celebrated, and also from the nave of the church where the people are placed: the patron is said to be obliged to repair the choir of the church. It was in the time of Constantine that the choir was separated from the nave. In the twelfth century, they began to inclose it with walls; but the ancient balustrades have been since restored, out of a view to the beauty of architecture.

CHOIR, in nunneries, is a large hall adjoining to the body of the church, separated by a grate, where the nuns sing the office.

CHOISI (Francis Timoleon de), dean of the cathedral of Bayeux, and one of the forty of the French academy, was born at Paris in 1644. In 1685, he was sent with the chevalier de Chaumont to the king of Siam, and was ordained priest in the Indies by the apostolical vicar. He wrote a great number of works, in a polite, florid, and easy style; the principal of which are, 1. Four dialogues on the Immortality of the soul, &c. 2. Account of a voyage to Siam. 3. An Ecclesiastical History, in 11 vols, 4^{to}. 4. Life of David, with an interpretation of the Psalms. 5. Life of Solomon, &c. He died at Paris in 1724.

CHOLEDOCHUS, in ANATOMY. See there, n^o 358.

CHOLER. See BILE.

CHOLERA MORBUS, a sudden eruption or overflowing of the bile or bilious matters both upwards and downwards. See (the *Index* subjoined to) MEDICINE.

CHONDROPTERYGII, in ichthyology, a term

formerly applied to the order of fishes now called *amphibia nantes* by Linnaeus. See AMPHIBIA.

CHOP-CHURCH, or CHURCH-CHOPPER, a name, or rather nick-name, given to parsons who make a practice of exchanging benefices. See PERMUTATION.

Chop-church occurs in an ancient statute as a lawful trade or occupation; and some of the judges say it was a good addition. Brook holds that it was no occupation, but a thing permissible by law.

CHOPIN, or CHOPINE, a liquid measure used both in Scotland and France, and equal to half their pint. See PINT and MEASURE.

CHOPIN (Rene), a famous civilian born at Bailleul in Anjou in 1537. He was advocate in the parliament of Paris, where he pleaded for a long time with great reputation. He at last shut himself up in his closet; and composed many works, which have been collected together, and printed in 6 vols, folio. He died at Paris in 1606.

CHORASSAN, or KHORASSAN, a province of Persia adjoining to Ubec Tartary. This was the ancient Bactria, and the birth-place of Kouli Khan.

CHORD, or CORD, primarily denotes a slender rope or cordage*. The word is formed of the Latin, *chorda*, and that from the Greek, χορδή, a gut, *dege*. * See COR- whereof strings may be made.

CHORD, in geometry, a right line drawn from one part of an arch of a circle to another. Hence,

CHORD of an Arch, is a right line joining the extremes of that arch.

CHORD, in music, the union of two or more sounds uttered at the same time, and forming together an entire harmony.

The natural harmony produced by the resonance of a sounding body, is composed of three different sounds, without reckoning their octaves; which form among themselves the most agreeable and perfect chord that can possibly be heard: for which reason they are called, on account of their excellence, *perfect chords*. Hence, in order to render that harmony complete, it is necessary that each chord should at least consist of three sounds. The trio is likewise found by musicians to include the perfection of harmony; whether because in this all the chords, and each in its full perfection, are used; or, because upon such occasions as render it improper to use them all, and each in its integrity, arts have been successfully practised to deceive the ear, and to give it contrary persuasion, by deluding it with the principal sounds of each chord, in such a manner as to render it forgetful of the other sounds necessary to their completion. Yet the octave of the principal sound produces new relations, and new consonances, by the completion of the intervals: they commonly add this octave, to have the assen- sible of all the consonances in one and the same chord; (see CONSONANCE.) Moreover, the addition of the dissonance, (see DISCORD,) producing a fourth sound superadded to the perfect chord, it becomes indispensibly necessary, if we would render the chord full, that we should include a fourth part to express this dissonance. Thus, the series of chords can neither be complete nor connected but by means of four parts.

Chords are divided into perfect and imperfect. The perfect chord is that which we have lately described; which.

Chord.

which is composed of the fundamental sound below, of its third, its fifth, and its octave : they are likewise subdivided into major and minor, according as the thirds which enter into their composition are flat or sharp : (See INTERVAL.) Some authors likewise give the name of *perfect* to all chords, even to dissonances, whose fundamental sounds are below. *Imperfect chords* are those in which the fifth, instead of the fifth, prevails, and in general all those whose lowest are not their fundamental sounds. These denominations, which had been given before the fundamental basis was known, are now most unhappily applied : those of chords *direct* and *reversed*, are much more suitable in the same sense. (See the account of *INVERTED Chords*).

Chords are once more divided into consonances and dissonances. The chords denominated *consonances*, are the perfect chord, and its derivatives : every other chord is a *dissonance*.

A table of both, according to the system of M. Rameau, may be seen in Roulleau's Musical Dictionary, vol. I. p. 27.

After the table to which our readers have been remitted, at Roulleau adds the following observations, which are at the same time so just and so important, that we should be very sorry if they escape the reader's attention.

At the words *harmony, fundamental basis, composition*, &c. he promises to treat concerning the manner of using all the chords to form regular harmony ; and only adds, in this place, the subsequent reflections.

1. It is a capital error to imagine, that the methods of inverting the same chord are in all cases equally eligible for the harmony, and for the expression. There is not one of these different arrangements, but has its proper character. Every one feels the contrast between the softness of the false fifth, and the grating sound of the tritone, though the one of these intervals is produced by a method of inverting the other. With the seventh diminished, and the second redundant, the case is the same with the interval of the second in general use, and the seventh. Who does not feel how much more vocal and sonorous the fifth appears when compared with the fourth ? The *chord* of the great sixth, and that of the lesser sixth minor, are two forms of the same fundamental *chord* : but how much less is the one harmonious than the other ? On the contrary, the *chord* of the lesser sixth major is much more pleasing and cheerful than that of the false fifth ? And only to mention the most simple of all *chords*, reflect on the majesty of the perfect chord, the sweetness of that which is called the chord of the sixth, and the insipidity of that which is composed of a sixth and a fourth ; all of them, however, composed of the same sounds. In general, the redundant intervals, the sharps in the higher part, are proper by their severity to express violent emotions of mind, such as anger and the rougher passions. On the contrary, flats in the higher parts, and diminished intervals, form a plaintive harmony, which melts the heart. There are a multitude of similar observations, of which when a musician knows how to avail himself, he may command at will the affections of those who hear him.

Chord
1
Chorion.

2. The choice of simple intervals is scarcely of less importance than that of the *chords*, with regard to the stations in which they ought to be placed. It is, for instance, in the lower parts that the fifth and octave should be used in preference ; in the upper parts, the third and sixth are more proper. If you transpose this order, the harmony will be ruined even though the same *chords* are preserved.

3. In a word, the *chords* are rendered still more harmonious, by being approximated and only divided by the smallest practicable intervals, which are more suitable to the capacity of the ear than such as are remote. This is what we call *contracting* the harmony, an art which few composers have skill and abilities enough to put in practice. The limits in the natural compass of voices, afford an additional reason for lessening the distance of the intervals, which compose the harmony of the chorus, as much as possible. We may affirm, that a chorus in improperly composed, when the distance between the *chords* increases ; when those who perform the different parts are obliged to scream ; when the voices rise above their natural extent, and are so remotely distant one from the other that the perception of harmonical relations between them is lost.

We say likewise, that an instrument is in *concord*, when the intervals between its fixed sounds are what they ought to be ; we say in this sense, that the *chords* of an instrument are true or false, that it preserves or does not preserve its *chords*. The same form of speaking is used for two voices which sing together, or for two sounds which are heard at the same time, whether in union or in parts.

CHORDS, or Chords, of Musical Instruments, are strings, by the vibration of which the sensation of sound is excited, and by the divisions of which the several degrees of tone are determined.

CHORDEE, in medicine and surgery, a symptom attending a gonorrhœa, consisting in a violent pain under the frenum, and along the duct of the urethra, during the erection of the penis, which is incurved downwards. These erections are frequent and involuntary.

CHOREA SANCTI VITI. See *VITUS's Dance*.

CHOREPISCOPUS, or COUNTRY-BISHOP, an assistant to a bishop, first introduced into the church when the dioceses became enlarged by the conversion of the Pagans in the country and villages at a distance from the mother-church.

CHOREPISCOPUS is also the name of a dignity in some cathedrals in Germany, signifying the same with chori-episcopus, or bishop of the choir. The first chanter in the church of Cologne is called chori-episcopus.

CHOREUS, *Xopeus*, a foot in the ancient poetry, more commonly called *trocheus*. See *TROCHEE*.

CHORIAMBUS, in ancient poetry, a foot consisting of four syllables, whereof the first and last are long, and the two middle ones are short ; or, which is the same thing, it is made up of a trocheus and iambus : such is the word *nobilitas*.

CHORION, in anatomy, the exterior membrane which invests the fœtus in the uterus. See *FŒTUS*.

CHOROBATA, or CHOROBATES, a kind of water

ter

ter level among the ancients, of the figure of the letter T, according to Vitruvius's description.

CHOROGRAPHY, the art of making a map of some country or province.

Chorography differs from geography, as the description of a particular country does from that of the whole earth; and from topography, as the description of a country differs from that of a town or district. See the articles **GEOGRAPHY**, **TOPOGRAPHY**, and **MAP**.

CHORUS, in dramatic poetry, one or more persons present on the stage during the representation, and supposed to be by-standers without any share in the action.

Tragedy in its origin was no more than a single chorus, who trod the stage alone, and without any actors, singing dithyrambs or hymns in honour of Bacchus. Thespis, to relieve the chorus, added an actor, who rehearsed the adventures of some of their heroes; and Æschylus, finding a single person too dry an entertainment, added a second, at the same time reducing the singing of the chorus, to make more room for the recitation. But when once tragedy began to be formed, the recitative, which at first was intended only as an accessory part to give the chorus a breathing time, became a principal part of the tragedy. At length, however, the chorus became inserted and incorporated into the action: sometimes it was to speak; and then their chief, whom they called *corryphæus*, spoke in behalf of the rest: the singing was performed by the whole company; so that when the *corryphæus* struck into a song, the chorus immediately joined him.

The chorus sometimes also joined the actors in the course of the representation, with their plaints and lamentations on account of any unhappy accidents that befel them: but the proper function, and that for which it seemed chiefly retained, was to shew the intervals of the acts: while the actors were behind the scenes, the chorus engaged the spectators; their songs usually turned on what was exhibited, and were not to contain any thing but what was suited to the subject, and had a natural connection with it; so that the chorus concurred with the actors for advancing the action. In the modern tragedies the chorus is laid aside, and the fiddles supply its place. Mr Dacier looks on this retrenchment as of ill consequence, and thinks it robs tragedy of a great part of its lustre; he therefore judges it necessary to re-establish it, not only on account of the regularity of the piece, but also to correct, by prudent and virtuous reflections, any extravagances that might fall from the mouths of the actors when under any violent passion.

Mr Dacier observed also, that there was a chorus, or *grex*, in the ancient comedy: but this is suppressed in the new comedy, because it was used to reprove vices by attacking particular persons; as the chorus of the tragedy was laid aside to give the greater probability to those kinds of intrigue which require secrecy.

CHORUS, in music, is when, at certain periods of a song, the whole company are to join the finger in repeating certain complets or verses.

CHOSE, (*Fr.*) "a thing;" used in the common law

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with divers epithets; as *chofe local*, *chofe transitory*, and *chofe in action*.

Chofe local is such a thing as is annexed to a place, as a mill and the like; *chofe transitory* is that thing which is moveable, and may be taken away, or carried from place to place; and *chofe in action* is a thing incorporeal, and only a *right*, as an obligation for debt, annuity, &c. And generally all canes of suit for any debt, duty, or wrong, are to be accounted *chofes in action*: and it seems, *chofe in action* may be also called *chofe in suspense*; because it hath no real existence or being, nor can properly be said to be in our possession.

CHOSROES I. the Great, king of Persia, after his father Cabades, *A. D.* 532. He made peace with the Romans; but broke it the third year, and forced Justinian to a disadvantageous peace. Afterwards, he was so swelled with his victories, as to bid the emperor's ambassador follow him for audience to Ctesarea: but Tiberius sent an army under Justinian; who made himself master of the country, and put Chosroes to death in 566.

CHOSROES II. His subjects put his father Hormisdas in prison, and the son upon the throne of Persia. He used his father tenderly at first; but afterwards caused him to be put to death. This, together with his killing some of the nobility, obliged him to fly: he gave his horse the bridle, which carried him into a town of the Romans, where Mauricius the emperor received him kindly, and sent an army under Narfes, which set him again upon the throne. He took Jerusalem; after this he made himself master of Libya and Egypt, and carried Carthage. Heraclius sued for peace; which was offered him on condition, *That he and his subjects should deny Jesus Christ*: Hereupon Heraclius attacked him with success, and put him to flight. His own son pursued him, and he was starved in prison in 627.

CHOUGH, in ornithology, the trivial name of a species of *Corvus*.

CHOUS, in the eastern military orders, the title of the messengers of the divan of janifaries. There are several degrees of honour in this post. When a person is first advanced to it, he is called a *cuchuk*, or little *chous*; after this he is advanced to be the *alby chous*; that is, the messenger of ceremonies; and from this, having passed through the office of *petelma*, or procurator of the effects of the body, he is advanced to be the *bas chous*.

CHREMNITZ, the principal of the nine-towns in Upper Hungary, situated about 68 miles north-east of Presburg, and subject to the house of Austria. *E. Long.* 19°. and *N. Lat.* 48. 45.

CHRISM, oil consecrated by the bishop, and used in the Romish and Greek churches in the administration of baptism, confirmation, ordination, and extreme unction.

CHRIST. See **CHRISTIANITY** and **MESSIAH**.
Order of CHRIST, a military order, founded by Dionysius I. king of Portugal, to animate his nobles against the Moors.—The arms of this order are gules, patriarchal cross, charged with another cross argent: they had their residence at first at Castromarin; afterwards they removed to the city of Thomar, as being nearer to the Moors of Andalusia and Estremadura.

Christ
|
Christianity

CHRIST is also the name of a military order in Livonia, instituted in 1205 by Albert bishop of Riga. The end of this institution was to defend the new Christians, who were converted every day in Livonia, but were persecuted by the heathens. They wore on their cloaks a sword with a cross over it, whence they were also denominated "brothers of the sword."

CHRIST-BURGH, a town of Poland, near the lake Draupen, and about three Polish miles from Marienburg.

CHRIST-CHURCH, a borough-town of Hampshire, 30 miles south-west of Winchester, near the sea-coast: W. Long. 2°. N. Lat. 50. 40. It sends two members to parliament.

CHRIST-THORN, in botany. See RHAMNUS.

Most CHRISTIAN KING, one of the titles of the king of France.

The French antiquaries trace the origin of this appellation up to Gregory the Great, who, writing a letter to Charles Martel, occasionally gave him that title, which his successors have since retained.

CHRISTIAN Religion, that instituted by Jesus Christ. See CHRISTIANITY.

1
Origin of
the word.

CHRISTIANITY, the religion of Christians. The word is analogically derived, as other abstracts from their concret, from the adjective *Christian*. This again is derived from the name *ΧΡΙΣΤΟΣ*, *Christus*, from the word *χρίω*, *I anoint*. Christ is called the *anointed*, from a custom which extensively prevailed in antiquity, and was originally said to be of divine institution, of anointing persons in the sacerdotal or regal character, as a public signal of their consecration to their important offices, and as a testimony that heaven itself was the guarantee of that relation which then commenced between the persons thus consecrated and their subordinates.

2
By what
name the
apostles
were first
distinguish-
ed.

The disciples of Jesus, after the death of their teacher, had for some time been called *Nazarenes*, from Nazareth in Galilee where he dwelt; which afterwards became the designation of a particular sect. They, who adopted the principles, and professed the religion which he taught, were first distinguished by the name of *Christians* at Antioch. That profession, and those doctrines, we now proceed to delineate with as much perspicuity as the limits of our plan will admit, yet with the conciseness which a work so multi-form and extensive requires.

3
Delineation
of Christi-
anity.

When a Christian is interrogated concerning the nature and foundation of his faith and practice, his ultimate reference, his last appeal, is to the facts, the doctrines, and the injunctions, contained in the books of the Old and New Testament. From these, therefore, and from these alone, must every fair account, or the materials of which it is composed, be extracted or deduced. Other formularies, or confessions of faith, may, according to the Christian, deserve more or less attention, as they are more or less immediately contained or implied in the scriptures. But whatever is not actually expressed in, or deduced by fair and necessary consequence from, these writings, must be regarded as merely human; and can have no other title to our assent and observation, than what they derive from their conformity with the scriptures, with the dic-

tates and feelings of a reformed and cultivated mind, or with those measures which are found expedient and useful in human life. But, as these books from whence the Christian investigates his principles of belief and rules of conduct, have been variously interpreted by different professors and commentators, these diversities have given birth to a multiplicity of different sects. It cannot, therefore, be expected, that any one who undertakes to give an account of Christianity, should comprehend all the writings and opinions which have been propagated and exhibited by historical, systematical, or polemical authors. These, if at all contained in such a work as this, should be ranged under their proper articles, whether scientific, controversial, or biographical. It is our present business, if possible, to confine ourselves to a detail of such facts and doctrines as, in the strict and primitive sense of the word, are *catholic*, or, in other expressions, to such as uniformly have been, and still are, recognized and admitted by the whole body of Christians.

4
Account of
Christiani-
ty, whence
deducible.

We have already said that these, or at least the greatest number of them, appeal to the scriptures of the Old and New Testament as the ultimate standard, the only infallible rule of faith and manners. If you ask them, by what authority these books claim an absolute right to determine the consciences and understandings of men with regard to what they should believe and what they should do? they will answer you, that all scripture, whether for doctrine, correction, or reproof, was given by immediate inspiration from God.

5
The nature
of its evi-
dences.

If again you interrogate them how those books, which they call Scripture, are authenticated? they reply, that the evidences by which the Old and New Testament are proved to be the Word of God, are either external or internal. The external may again be divided into direct or collateral. The direct evidences are such as arise from the nature, consistency, and probability, of the facts; and from the simplicity, uniformity, competency, and fidelity, of the testimonies by which they are supported. The collateral events, are either the same occurrences supported by Heathen testimonies, or others which concur with and corroborate the history of Christianity. Its internal evidences arise either from its exact conformity with the character of God, from its aptitude to the frame and circumstances of man, or from those supernatural convictions and assistances which are impressed on the mind by the immediate operation of the divine Spirit. These can only be mentioned in a cursory manner in a detail so concise as the present.

6
How Chri-
stianity is
supported
by facts.

Such facts as are related in the history of his religion, the Christian asserts to be not only consistent each with itself, but likewise one with another. Hence it is, that, by a series of antecedents and consequences, they corroborate each other, and form a chain which cannot be broken but by an absolute subversion of all historical authenticity. Nor is this all: for, according to him, the facts on which Christianity is founded, not only constitute a series of themselves, but are likewise in several periods the best resources for supplying the chasms in the history of our nature, and preserving the tenor of its annals entire. The facts themselves are either natural, or supernatural.

By

Christianity

By natural facts we mean such occurrences as happen or may happen from the various operations of mechanical powers, or from the interpolation of natural agents without higher assistants. Such are all the common occurrences of history, whether natural, biographical, or civil. By supernatural facts, we mean such as could not have been produced without the interposition of Deity, or at least of powers superior to the laws of mechanism or the agency of embodied spirits. Among these may be reckoned the immediate change of water into wine, the instantaneous cure of diseases without the intervention of medicine, the resuscitation of the dead, and others of the same kind. In this order of occurrences may likewise be numbered the exertions and exhibitions of prophetic power, where the persons by whom these extraordinary talents were displayed could neither by penetration nor conjecture unravel the mazes of futurity, and trace the events of which they spoke from their primary causes to their remote completions. So that they must have been the passive organs of some superior Being to whom the whole concatenation of causes and effects which operate from the origin to the consummation of nature, was obvious at a glance of thought.

7
Natural facts, what, and how conducive to the elucidation of history.

It has already been hinted, that the facts which we have called *natural*, not only agree with the analogy of human events, and corroborate each other, but in a great many emergencies nobly illustrate the history of human in general. For this a Christian might offer one instance, of which philosophy will not perhaps be able to produce any tolerable solution, without having recourse to the facts upon which Christianity is founded. For if mankind were originally descended from one pair alone, how should it have happened that long before the date of authentic history every nation had its own distinct language? Or if it be supposed, as some late philosophers have maintained, that man is an indigenous animal in every country; or, that he was originally produced in, and created for, each particular soil and climate which he inhabits; still it may be demanded, whence the prodigious multiplicity, the immense diversity, of languages? Is the language of every nation intuitive, or were they dictated by exigencies, and established by convention? If the last of these suppositions be true, what an immense period of time must have passed? How many revolutions of material and intellectual nature must have happened? What accessions of knowledge, refinement, civilization, must human intercourse have gained before the formation and establishment even of the most simple, imperfect, and barbarous language? Why is a period so vast, obliterated so entirely as to escape the retrospect of history, of tradition, and even of fable itself? Why was the acquisition and improvement of other arts so infinitely distant from that of language, that the era of the latter is entirely lost, whilst we can trace the former from their origin through the various gradations of their progress.

8
This obscurity inexplicable but by the Mosaic account.

These difficulties, inextricable by all the lights of history or philosophy, this more than Cimmerian darkness is immediately dissipated by the Mosaic account of the confusion of tongues; wisely intended to separate the tribes of men one from another, to replenish the surface of the globe, and to give its multiplied in-

habitants those opportunities of improvement which Christianity might be derived from experiment and industry, variously exerted, according to the different situations in which they were placed, and the different employments which these situations dictated. Thus the time of nature's existence is limited to a period within the ken of human intellect. Thus whatever has happened might have happened during the present mode of things; whereas, if we deduce the origin and diversity of language from a period so remotely distant as to be absolutely lost, and entirely detached from all the known occurrences and vicissitudes of time, we must admit the present forms and arrangements of things to have subsisted perhaps for a much longer duration than any mechanical philosopher will allow to be possible. Other instances equally pregnant with conviction might be multiplied; but, precluded by the limits of our plan, we proceed to a single observation upon the facts which have been termed supernatural.

Of those changes which happen in sensible objects, sensation alone can be judge. Reason has nothing to do in the matter. She may draw conclusions from the testimonies of sense, but can never refute them. If, therefore, our senses inform us that snow is white, in vain would the most learned and subtle philosopher endeavour to convince us that it was of a contrary colour. He might confound us, but never could persuade us. Such changes, therefore, as appear to happen in sensible objects, must either be real or fallacious. If real, the miracle is admitted; if fallacious, there must be a cause of deception equally unaccountable from the powers of nature, and therefore equally miraculous. If the veracity or competency of the witnesses be questioned, the Christian answers, that they must be competent, because the facts which they relate are not beyond their capacity to determine. They must likewise be faithful, because they had no secular motives for maintaining, but many for suppressing or disguising, what they testified. Now the Christian appeals to the whole series of history and experience, whether such a man is or can be found, as will offer a voluntary, solemn, and deliberate sacrifice of truth at the shrine of caprice. But such facts as after a long continuance of time have been found exactly agreeable to predictions formerly emitted, must fully persuade the fidelity of testimony, and infallibly prove, that the event was known to the Being by whom it was foretold. In vain has it been urged, that prophecies are ambiguous and equivocal. For though they may prefigure subordinate events, yet if the grand occurrences to which they ultimately relate, can alone fulfil them in their various circumstances, and in their utmost extent, it is plain, that the Being by whom they were revealed must have been actually present of those events, and must have had them in view when the predictions were uttered. For this see a learned and ingenious dissertation on the Credibility of Gospel-history, by Dr McKnight; where the evidences urged by the Christian in defence of his tenets, which appear detached and scattered through innumerable volumes, are assembled and arranged in such a manner as to derive strength and lustre from the method in which they are disposed, without diminishing the force of each in particular. See also the

9
Miracles, how conducive to prove the truth of Christianity.

10
Prophecy evident by its own nature independent of its vehicles.

Christianity works of Dr Hurd: consult likewise those of Newton, Sherlock, Chandler, &c. For the evidences of those preternatural facts which have been termed miracles, the reader may peruse a short but elegant and conclusive defence of these astonishing phenomena, in answer to Mr Hume, by the Rev. George Campbell, D. D.

11
Properties
common to
all religions.

It must be obvious to every reflecting mind, that whether we attempt to form the idea of any religion *a priori*, or contemplate those which have been already exhibited, certain facts, principles, or data, must be pre-established, from whence will result a particular frame of mind and course of action suitable to the character and dignity of that Being by whom the religion is enjoined, and adapted to the nature and situation of those agents who are commanded to observe it. Hence *Christianity* may be divided into *credenda* or doctrines, and *agenda* or precepts.

12
Christian
theology.

.. As the great foundation of his religion, therefore, the Christian believes the existence and government of one eternal and infinite Essence, which for ever retains in itself the cause of its own existence, and inherently possesses all those perfections which are compatible with its nature: such are, its almighty power, omniscient wisdom, infinite justice, boundless goodness, and universal presence. In this indivisible essence the Christian recognises three distinct subsistences, yet distinguished in such a manner as not to be incompatible with essential unity or simplicity of being. Nor is their essential union incompatible with their personal distinction. Each of them possesses the same nature and properties to the same extent. As, therefore, they are constituent of one God, if we may use the expression, there is none of them subordinate, none supreme. The only way by which the Christian can discriminate them, is by their various relations, properties, and offices. Thus the Father is said eternally to beget the Son, the Son to be eternally begotten of the Father, and the Holy Ghost eternally to proceed from both.

This infinite Being, though absolutely independent and for ever sufficient for his own beatitude, was graciously pleased to create an universe replete with inferior intelligences, who might for ever contemplate and enjoy his glory, participate his happiness, and imitate his perfections. But as freedom of will is essential to the nature of moral agents, that they may co-operate with God in their own improvement and happiness, so their natures and powers are necessarily limited, and by that constitution rendered peccable. This degeneracy first took place in a rank of intelligence superior to man. But guilt is never stationary. Impatient of itself, and cursed with its own feelings, it proceeds from bad to worse, whilst the poignancy of its torments increases with the number of its perpetrations. Such was the situation of Satan and his apostate angels. They attempted to transfer their turpitude and misery to man; and were, alas! but too successful. Hence the heterogeneous and irreconcilable principles which operate in his nature. Hence that inexplicable medley of wisdom and folly, of rectitude and error, of benevolence and malignity, of sincerity and fraud, exhibited through his whole conduct. Hence the darkness of his understanding, the depravity of his will, the pollution of his heart, the ir-

regularity of his affections, and the absolute subversion of his whole internal economy. These seeds of perdition soon ripened into overt acts of guilt and horror. All the hostilities of nature were confronted, and the whole sublunary creation became a theatre of disorder and mischief.

Here the Christian once more appeals to fact and experience. If these things are so; if *man* is the vessel of guilt and the victim of misery; he demands how this constitution of things can be accounted for? how can it be supposed, that a being so wicked and unhappy should be the production of an infinitely perfect Creator? He therefore insists, that human nature must have been disarranged and contaminated by some violent shock; and that, of consequence, without the light diffused over the face of things by Christianity, all nature must remain an inscrutable and inexplicable mystery.

To redress these evils, to re-establish the empire of virtue and happiness, to restore the nature of man to its primitive rectitude, to satisfy the remonstrances of infinite justice, to purify every original or contracted stain, to expiate the guilt and destroy the power of vice, the eternal Son of God, the second person of the sacred Trinity, the Logos or divine Word, the Redeemer or Saviour of the world, the Immanuel or God with us, from whom *Christianity* takes its name, and to whom it owes its origin, descended from the bosom of his Father; assumed the human nature; became the representative of man; endured a severe probation in that character; exhibited a pattern of perfect righteousness; and at last ratified his doctrine, and fully accomplished all the ends of his mission, by a cruel, unmerited, and ignominious death. Before he left this world, he delivered the doctrine of human salvation, and the rules of human conduct, to his apostles, whom he empowered to instruct the world in all that concerned their eternal felicity, and whom he invested with miraculous gifts to ascertain the reality of what they taught. To them he likewise promised another comforter, even the divine Spirit, who should relieve the darkness, console the woes, and purify the stains, of human nature. Having remained for a part of three days under the power of death, he arose again from the grave, discovered himself to his disciples, conversed with them for some time, then re-ascended to heaven; from whence the Christian expects him, according to his promise, to appear as the Sovereign Judge of the living and the dead, from whose awards there is no appeal, and by whose sentence the destiny of the pious and the wicked shall be eternally fixed.

Soon after his departure to the right hand of his Father, where, in his human nature, he sits supreme of all created beings, and invested with the absolute administration of heaven and earth, the Spirit of grace and consolation descended on his apostles with visible signatures of divine power and presence. Nor were his salutary operations confined to them, but extended to all the rational world, who did not by obstinate guilt repel his influences, and provoke him to withdraw them. These, indeed, were less conspicuous than at the glorious era when they were visibly exhibited in the persons of the apostles. But
though

Christianity though his energy is less observable, it is by no means less effectual to all the purposes of grace and mercy.

The Christian is convinced, that there is and shall continue to be a society upon earth, who worship God as revealed in Jesus Christ; who believe his doctrines; who observe his precepts; and who shall be saved by his death, and by the use of these external means of salvation which he hath appointed.

13
The external means of Christianity, what, and how promotive of their end.

These are few and simple. The sacraments of baptism and the eucharist, the interpretation and application of scripture, the habitual exercise of public and private devotion, are obviously calculated to diffuse and promote the interests of truth and virtue, by superinducing the salutary habits of faith, love, and repentance.

The Christian is firmly persuaded, that at the consummation of things, when the purposes of providence in the various revolutions of progressive nature are accomplished, the whole human race shall once more issue from their graves; some to immortal felicity, from the actual perception and enjoyment of their Creator's preference; others to everlasting shame and misery.

14
Christian morality.

The two grand principles of action, according to the Christian, are, The love of God, which is the sovereign passion in every perfect mind; and the love of man, which regulates our actions according to the various relations in which we stand, whether to communities or individuals. This sacred connection can never be totally extinguished by any temporary injury. It ought to subsist in some degree even amongst enemies. It requires that we should pardon the offences of others, as we expect pardon for our own; and that we should no further resist evil than is necessary for the preservation of personal rights and social happiness. It dictates every relative and reciprocal duty between parents and children, masters and servants, governors and subjects, friends and friends, men and men. Nor does it merely enjoin the observation of equity, but likewise inspires the most sublime and extensive charity, a boundless and disinterested effusion of tenderness for the whole species, which feels their distresses and operates for their relief and improvement. These celestial dispositions, and the different duties which are their natural exertions, are the various gradations by which the Christian hopes to attain the perfection of his nature and the most exquisite happiness of which it is susceptible.

15
This system, asserted by the Christian, superior in the excellence of its nature, and the evidence of its reality, to all others.

Such are the speculative, and such the practical principles of Christianity. From the former, its votaries contend, that the origin, economy, and revolutions of intelligent nature alone can be rationally explained. From the latter, they assert, that the nature of man, whether considered in its individual or social capacity, can alone be conducted to its highest perfection and happiness. With the determined Atheists, they scarcely desire to expostulate. For, according to them, philosophers who can deduce the origin and constitution of things from casual encounters or mechanical necessity, are capable of deducing any conclusion from any premises. Nor can a more glaring instance of absurdity be produced, than the idea of a contingent or self-originated universe. When Deists and other sectarians upbraid them with myste-

rious or incompatible principles, they without hesitation remit such cavillers to the creed of natural religion. They demand why any reasoner should refuse to believe three distinct subsistences in one indivisible essence, who admits that a being may be omnipresent without extension; or that he can impress motion upon other things, whilst he himself is necessarily immovable. They ask the sage, why it should be thought more extraordinary, that the Son of God should be sent to this world, that he should unite the human nature to his own, that he should suffer and die for the relief of his degenerate creatures, than that an existence whose felicity is eternal, inherent, and infinite, should have any motive for creating beings exterior to himself. Is it not, says the Christian, equally worthy of the divine interposition to restore order and happiness where they are lost, as to communicate them where they never have been? Is not infinite goodness equally conspicuous in relieving misery as in diffusing happiness? Is not the existence of what we call evil in the world, under the tuition of an infinitely perfect Being, as inscrutable as the means exhibited by Christianity for its abolition. Vicarious punishment, imputed guilt and righteousness, merit or demerit transferred, are certainly no less reconcilable to human reason, *a priori*, than the existence of vice and punishment in the productions of infinite wisdom, power, and goodness: particularly, when it is considered, that the virtues exerted and displayed by a perfect Being in a state of humiliation and suffering, must be meritorious, and may therefore be rewarded by the restored felicity of inferior creatures, in proportion to their glory and excellence; and that such merit may apply the blessings which it has deserved, in whatever manner, in whatever degree, and to whomsoever it pleases, without being under any necessity to violate the freedom of moral agents, in recalling them to the paths of virtue and happiness by a mechanical and irresistible force.

It will be granted to philosophy by the Christian, that as no theory of mechanical nature can be formed without presupposing sacred and established laws from which he ought rarely or never to deviate, so in fact she tenaciously pursues these general institutions, and from their constant observance result the order and regularity of things. But he cannot admit, that the important ends of moral and intellectual improvement may be uniformly obtained by the same means. He affirms, that if the hand of God should either remain always entirely invisible, or at least only perceptible in the operation of second causes, intelligent beings would be apt in the course of time to resolve the interpositions of Deity into the general laws of mechanism; to forget his connection with nature, and consequently their dependence upon him. Hence, according to the dictates of common-sense, and to the unanimous voice of every religion in every age or clime, for the purposes of wisdom and benevolence, God may not only control, but has actually controlled, the common course and general operations of nature. So that, as in the material world the law of *cause and effect* is generally and scrupulously observed for the purposes of natural subsistence and accommodation; thus suspenses and changes of that universal law are equally necessary for

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Miraculous as possible, and perhaps as necessary as natural events.

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Christianity the advancement of moral and intellectual perfection.

17 But the disciple of Jesus not only contends, that no system of religion has ever yet been exhibited so consistent with itself, so congruous to philosophy and the common sense of mankind, as Christianity. He likewise avers, that it is infinitely more productive of real and sensible consolation than any other religious or philosophical tenets, which have ever entered into the soul, or been applied to the heart of man. For what is death to that mind which considers eternity as the career of its existence? What are the frowns of fortune to him who claims an eternal world as his inheritance? What are the loss of friends to that heart which feels, with more than natural conviction, that it shall quickly rejoin them in a more tender, intimate, and permanent intercourse than any of which the present life is susceptible? What are the fluctuations and vicissitudes of external things to a mind which strongly and uniformly anticipates a state of endless and immutable felicity? What are mortifications, disappointments, and insults, to a spirit which is conscious of being the original offspring and adopted child of God; which knows that its omnipotent Father will, in proper time, effectually assert the dignity and privileges of its nature? In a word, as earth is but a speck of creation, as time is not an instant in proportion to eternity, such are the hopes and prospects of the Christian in comparison of every sublunary misfortune or difficulty. It is therefore, in his judgment, the eternal wonder of angels, and indelible opprobrium of man, that a religion so worthy of God, so suitable to the frame and circumstances of our nature, so consonant to all the dictates of reason, so friendly to the dignity and improvement of intelligent beings, pregnant with genuine comfort and delight, should be rejected and despised. Were there a possibility of suspense or hesitation between this and any other religion extant, he could freely trust the determination of a question so important to the candid decision of real virtue and impartial philosophy.

Thus have we given what we hope will be esteemed a genuine, though short, account of those principles of faith and rules of action which are received by the generality of Christians. Such points as are either disputable or have been controverted by different sects, we have industriously endeavoured to avoid. But every man who profoundly reflects will easily see, that this plan, in its full extent, was impracticable. A more minute detail of its origin, progress, and establishment, is given under the article MESSIAH.

CHRISTIANS, those who profess the religion of Christ. See CHRISTIANITY, and MESSIAH.

The first Christians distinguished themselves in the most remarkable manner by their conduct and their virtues. The faithful, whom the preaching of St Peter had converted, hearkened attentively to the exhortations of the Apostles, who failed not carefully to instruct them, as persons who were entering upon an entirely new life. They went every day to the temple with one heart and one mind, and continued in prayers; doing nothing different from the other Jews, because it was not yet time to separate from them. But they

made a still greater progress in virtue; for they sold all that they possessed, and distributed their goods in proportion to the wants of their brethren. They eat their meat with gladness and singleness of heart, praising God, and having favour with all the people. St Chrysostom, examining from what source the eminent virtue of the first Christians flowed, ascribes it principally to their divesting themselves of their possessions: "For (says that father) persons from whom all that they have is taken away are not subject to sin: where- as, whoever has large possessions wants not a devil or a tempter to draw him into hell by a thousand ways."

The Jews were the first, and the most inveterate enemies the Christians had. They put them to death as often as they had it in their power: and, when they revolted against the Romans in the time of the emperor Adrian, Barchochebas, the head of that revolt, employed against the Christians the most rigorous punishments, to compel them to blaspheme and renounce Jesus Christ. And we find that, even in the 3^d century, they endeavoured to get into their hands Christian women, in order to scourge and stone them in their synagogues. They cursed the Christians solemnly three times a day in their synagogues, and their rabbins would not suffer them to converse with Christians upon any occasion. Nor were they contented to hate and detest them: but they dispatched emissaries all over the world to defame the Christians, and spread all sorts of calumnies against them. They accused them, among other things, of worshipping the sun, and the head of an ass. They reproached them with idleness, and being an useless race of people. They charged them with treason, and endeavouring to erect a new monarchy against that of the Romans. They affirmed, that, in celebrating their mysteries, they used to kill a child, and eat its flesh. They accused them of the most shocking incests, of impudence, avarice, and sometimes of prodigality, and of intemperance in their feasts of charity. But the lives and behaviour of the first Christians were sufficient to refute all that was said against them, and evidently demonstrated, that these accusations were meer calumny, and the effect of inveterate malice.

Pliny the younger, who was governor of Pontus and Bithynia, between the years 103 and 105, gives a very particular account of the Christians in that province, in a letter which he wrote to the emperor Trajan, of which the following is an extract: "I take the liberty, Sir, to give you an account of every difficulty which arises to me. I have never been present at the examination of the Christians; for which reason I know not what questions have been put to them, nor in what manner they have been punished. My behaviour towards those who have been accused to me has been this: I have interrogated them, in order to know whether they were really Christians. When they have confessed it, I have repeated the same question two or three times, threatening them with death, if they did not renounce this religion. Those who have persisted in their confession, have been, by my order, led to punishment. I have even met with some Roman citizens guilty of this phrensy, whom, in regard

Christians.

"regard to their quality, I have set apart from the rest, in order to send them to Rome. These persons declare, that their whole crime, if they are guilty, consists in this; that, on certain days, they assemble before sun-rise, to sing alternately the praises of Christ, as of a God, and to oblige themselves, by the performance of their religious rites, not to be guilty of theft, or adultery, to observe inviolably their word, and to be true to their trust. This disposition has obliged me to endeavour to inform myself still farther of this matter, by putting to the torture two of their women-servants, whom they call *deaconesses*: but I could learn nothing more from them, than that the superstition of these people is as ridiculous, as their attachment to it is prodigious."

There is extant a justification, or rather panegyric, of the Christians, pronounced by the mouth of a Pagan prince. It is a letter of the emperor Antoninus, written in the year 152, in answer to the states of Asia, who had accused the Christians of being the cause of some earthquakes which had happened in that part of the world. The emperor advises them to "take care, lest, in torturing and punishing those, whom they accused of atheism, (*meaning the Christians*), they should render them more obstinate, instead of prevailing upon them to change their opinion; since their religion taught them to suffer with pleasure for the sake of God." As to the earthquakes that had happened, he puts them in mind, that "they themselves are always discouraged, and sink under such misfortunes; whereas the Christians never discovered more cheerfulness and confidence in God, than upon such occasions." He tells them, that "they pay no regard to religion, and neglect the worship of the eternal; and, because the Christians honour and adore him, therefore they are jealous of them, and persecute them even to death." He concludes: "many of the governors of provinces have formerly written to my father concerning them, and his answer always was, that they should not be molested or disturbed, provided they quietly submitted to the authority of the government. Many persons have likewise consulted me upon this affair, and I have returned the same answer to them all; namely, that, if any one accuses a Christian merely on account of his religion, the accused person shall be acquitted, and the accuser himself punished." This ordinance, according to Eusebius, was publicly fixed up at Ephesus, in an assembly of the states.

It is no difficult matter to discover the causes of the many persecutions, to which the Christians were exposed during the three first centuries. The purity of the Christian morality, directly opposite to the corruption of the Pagans, was doubtless one of the most powerful motives of the public aversion. To this may be added, the many calumnies unjustly spread about concerning them, by their enemies, particularly the Jews. And this occasioned so strong a prejudice against them, that the Pagans condemned them without inquiring into their doctrine, or permitting them to defend themselves. Besides, their worshipping Jesus Christ, as God, was contrary to one of the most ancient laws of the Roman empire, which expressly for-

bad the acknowledging of any god, which had not been approved by the senate.

But, notwithstanding the violent opposition made to the establishment of the Christian Religion, it gained ground daily, and very soon made a surprising progress in the Roman empire. In the 3^d century, there were Christians in the camp, in the senate, in the palace, in short every where, but in the temples, and the theatres: they filled the towns, the country, the islands. Men and women, of all ages and conditions, and even those of the first dignities embraced the faith; inasmuch that the Pagans complained, that the revenues of their temples were ruined. They were in such great numbers in the empire, that (as Tertullian expresses it) were they to have retired into another country, they would have left the Romans only a frightful solitude.

The primitive Christians were not only remarkable for the practice of every virtue: they were also very eminently distinguished by the many miraculous gifts, and graces, bestowed by God upon them. "Some of the Christians (says Irenæus) drive out devils, not in appearance only, but so as that they never return; whence it often happens, that those, who are possessed of evil spirits, embrace the faith, and are received into the Church. Others know what is to come, see visions, and deliver oracles as prophets. Others heal the sick by laying their hands on them, and restore them to perfect health: and we find some, who even raise the dead.—It is impossible to reckon up the gifts and graces, which the Church has received from God—what they have freely received they as freely bestow. They obtain these gifts by prayer alone, and invocation of the name of Jesus Christ, without any mixture of enchantment, or superstition."

We shall here subjoin the remarkable story attested by Pagan authors themselves, concerning the *Christian Legion* in the army of the emperor Marcus Aurelius. That prince, having led his forces against the Quadi, a people on the other side of the Danube, was surrounded and hemmed in by the enemy, in a disadvantageous place, and where they could find no water. The Romans were greatly embarrassed, and, being pressed by the enemy, were obliged to continue under arms, exposed to the violent heat of the sun, and almost dead with thirst; when, on a sudden, the clouds gathered, and the rain fell in great abundance. The soldiers received the water in their bucklers and helmets, and satisfied both their own thirst, and that of their horses. The enemy, presently after, attacked them; and so great was the advantage they had over them, that the Romans must have been overthrown, had not heaven again interposed by a violent storm of hail, mixed with lightning, which fell on the enemy, and obliged them to retreat. It was found afterwards, that one of the legions, which consisted of *Christians*, had, by their prayers, which they offered up on their knees before the battle, obtained this favour from heaven: and from this event that legion was named the *thundering Legion*. See, however, the criticism of Mr Moyle on this story, in his *Works*, vol. ii. p. 81—390. See also *Musheim's Church History*, vol. i. p. 124.

Such were the primitive Christians, whose religion

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has by degrees spread itself over all parts of the world, though not with equal purity in all. And though, by the providence of God, Mohammedans and Idolaters have been suffered to possess themselves of those places in Greece, Asia, and Africa, where the Christian religion formerly most flourished; yet they are still such remains of the Christian religion among them, as to give them opportunity sufficient to be converted. For, in the dominions of the Turk in Europe, the Christians make two third parts at least of the inhabitants; and in Constantinople itself there are above twenty Christian churches, and above thirty in Thessalonica. Philadelphia, now called Ala-shahir, has no fewer than twelve Christian churches. The whole island of Chio is governed by Christians: and some islands of the Archipelago are inhabited only by Christians. In Africa, besides the Christians living in Egypt, and in the kingdom of Congo and Angola, the islands upon the western coasts are inhabited by Christians; and the vast kingdom of Abyssinia, supposed to be as big as Germany, France, Spain, and Italy, put together, is possessed by Christians. In Asia, most part of the empire of Russia, the countries of Circassia and Mingrelia, Georgia, and mount Libanus, are inhabited only by Christians. In America, it is notorious, that the Christians are very numerous, and spread over most parts of that vast continent.

CHRISTIANS of *St John*, a sect of Christians very numerous in Balfara and the neighbouring towns: they formerly inhabited along the river Jordan, where St John baptized, and it was from thence they had their name. They hold an anniversary feast of five days; during which they all go to the bishop, who baptizes them with the baptism of St John. Their baptism is also performed in rivers, and that only on Sundays: they have no notion of the third Person in the Trinity; nor have they any canonical book, but abundance full of charms, &c. Their bishoprics descend by inheritance, as our estates do, though they have the ceremony of an election.

CHRISTIANS of *St Thomas*, a sort of Christians in a peninsula of India, on this side of the gulf: they inhabit chiefly at Cranganor, and the neighbouring country: these admit of no images; and receive only the cross, to which they pay a great veneration: they affirm, that the souls of the saints do not see God till after the day of judgment: they acknowledge but three sacraments, *viz.* baptism, orders, and the eucharist: they make no use of holy oils in the administration of baptism; but, after the ceremony, anoint the infant with an unction composed of oil and walnuts, without any benediction. In the eucharist, they consecrate with little cakes made of oil and salt, and instead of wine make use of water in which raisins have been infused.

CHRISTIANA, a town of Norway, in the province of Aggerhuys, situated on a bay of the sea. E. Long. 10. 15. N. Lat. 59. 30.

CHRISTIANOPLE, a port-town of Sweden, situated on the Baltic sea, in the territory of Blecking, and province of South Gothland. E. Long. 15. 40. N. Lat. 57°.

CHRISTIANSTADT, a town of Sweden; situated on the river Helles, in the territory of Blecking, and

province of South Gothland. E. Long. 14. 40. N. Lat. 56. 30.

CHRISTINA, daughter of Gustavus Adolphus king of Sweden, was born in 1626; and succeeded to the crown in 1633, when only seven years of age. This princess discovered even in her infancy what she afterwards expressed in her memoirs, an invincible antipathy for the employments and conversation of women; and she had the natural awkwardness of a man, with respect to all the little works which generally fall to their share. She was, on the contrary, fond of violent exercises, and such amusements as consist in feats of strength and activity; she had also both ability and taste for abstracted speculations; and amused herself with language and the sciences, particularly that of legislature and government. She derived her knowledge of ancient history from its source; and Polybius and Thucydides were her favourite authors. As she was the sovereign of a powerful kingdom, it is not strange that almost all the princes in Europe aspired to her bed: Among others, were the Prince of Denmark, the Elector Palatine, the Elector of Brandenburg, the king of Spain, the king of the Romans, Don John of Austria, Sigismund of Rockocci, count and general of Cassovia; Stanislaus, king of Poland; John Cassimir, his brother; and Charles Gustavus, duke of Deux Ponts, of the Bavarian Palatinate family, son of her father the great Gustavus's sister, and consequently her first cousin. To this nobleman, as well as to all his competitors, she constantly refused her hand; but she caused him to be appointed her successor by the states. Political interests, differences of religion, and contrariety of manners, furnished Christina with pretences for rejecting all her suitors; but her true motives were the love of independence, and a strong aversion she had conceived, even in her infancy, from the marriage yoke. "Do not force me to marry, (said she to the states); for if I should have a son, it is not more probable that he should be an Augustus than a Nero."

An accident happened in the beginning of her reign which gave her a remarkable opportunity of displaying the strength and equanimity of her mind. As she was at the chapel of the castle of Stockholm, assisting at divine service with the principal lords of her court, a poor wretch, who was disordered in his mind, came to the place with a design to assassinate her. This man who was preceptor of the college, and in the full vigour of his age, chose, for the execution of his design, the moment in which the assembly was performing what in the Swedish church is called an *act of recollection*, a silent and separate act of devotion performed by each individual kneeling and hiding the face with the hand. Taking this opportunity, he rushed through the crowd, and mounted a ballustrade within which the queen was upon her knees: the baron Braki, chief justice of Sweden, was alarmed, and cried out; and the guards crossed their partisans, to prevent his coming further: but he struck them furiously on one side; leaped over the barrier; and, being then close to the queen, made a blow at her with a knife which he had concealed without a sheath in his sleeve. The queen avoided the blow, and pushed the captain of her guards, who instantly threw

Christina.

Christina. threw himself upon the assassin, and seized him by the hair. All this happened in less than a moment of time. The man was known to be mad, and therefore nobody supposed he had any accomplices: they therefore contented themselves with locking him up; and the queen returned to her devotion without the least emotion that could be perceived by the people, who were much more frightened than herself.

One of the great affairs that employed Christina while she was upon the throne, was the peace of Westphalia, in which many clashing interests were to be reconciled, and many claims to be ascertained. It was concluded in the month of October 1648. The success of the Swedish arms rendered Christina the arbitress of this treaty; at least as to the affairs of Sweden, to which this peace confirmed the possession of many important countries. No public event of importance took place during the rest of Christina's reign; for there were neither wars abroad, nor troubles at home. This quiet might be the effect of chance; but it might also be the effect of a good administration, and the great reputation of the queen; and the love her people had for her ought to lead us to this determination. Her reign was that of learning and genius. She drew about her, wherever she was, all the distinguished characters of her time: Grotius, Pascal, Bochart, Descartes, Gassendi, Saumaise, Naude, Vossius, Heinsius, Meibom, Scudery, Menage, Lucas, Holstenius, Lambecius, Bayle, madam Dacier, Filicaja, and many others. The arts never fail to immortalize the prince who protects them; and almost all these illustrious persons have celebrated Christina, either in poems, letters, or literary productions of some other kind, the greater part of which are now forgotten. They form, however, a general cry of praise, and a mass of testimonials which may be considered as a solid basis of reputation. Christina, however, may be justly reproached with want of taste, in not properly assigning the rank of all these persons, whose merits, though acknowledged, were yet unequal; particularly for not having been sufficiently sensible of the superiority of Descartes, whom she disgusted, and at last wholly neglected. The rapid fortune which the adventurer Michon, known by the name of *Bourdelot*, acquired by her countenance and liberality, was also a great scandal to literature. He had no pretensions to learning; and though sprightly, was yet indecent. He was brought to court by the learned Saumaise; and, for a time, drove literary merit entirely out of it, making learning the object of his ridicule, and exacting from Christina an exorbitant tribute to the weaknefs and inconstancy of her sex; for even Christina, with respect to this man, shewed herself to be weak and inconstant. At last she was compelled, by the public indignation, to banish this unworthy minion; and he was no sooner gone, than her regard for him was at an end. She was ashamed of the favour he had shewn him; and, in a short time, thought of him with hatred or contempt. This Bourdelot, during his ascendancy over the queen, had supplanted count Magnus de la Gardie, son of the constable of Sweden, who was a relation, a favourite, and perhaps the lover of Christina. M. de Morteville, who had seen him am-

ballador in France, says, in his memoirs, that he spoke of his queen in terms so passionate and respectful, that every one concluded his attachment to her to be more ardent and tender, than a more sense of duty can produce. This nobleman fell into disgrace because he shewed an inclination to govern; while M. Bourdelot seemed to aim at nothing more than to amuse, and concealed, under the unsuspected character of a droll, the real ascendancy which he exercised over the queen's mind.

About this time, an accident happened to Christina which brought her into still greater danger than that which has been related already. Having given orders for some ships of war to be built at the port of Stockholm, she went to see them when they were finished; and as she was going on board of them, cross a narrow plank, with admiral Fleming, his foot slipping, he fell, and drew the queen with him into the sea, which in that place was near 90 feet deep. Anthony Steinberg, the queen's first eunuch, instantly threw himself into the water, laid hold of her robe, and, with such assistance as was given him, got the queen ashore: during this accident, her recollection was such, that the moment her lips were above water, she cried out, "Take care of the Admiral." When she was got out of the water, she discovered no emotion either by her gesture or countenance; and she dined the same day in public, where she gave a humorous account of her adventure.

But, though at first she was fond of the power and splendor of royalty, yet she began at length to feel that it embarrassed her; and the same love of independence and liberty which had determined her against marriage, at last made her weary of her crown. As, after her first disgust, it grew more and more irksome to her, she resolved to abdicate; and, in 1652, communicated her resolution to the senate. The senate zealously remonstrated against it; and was joined by the people; and even by Charles Gustavus himself, who was to succeed her: she yielded to their importunities, and continued to sacrifice her own pleasure to the will of the public till the year 1654, and then she carried her design into execution. It appears by one of her letters to M. Canut, in whom she put great confidence, that she had meditated this project for more than eight years; and that she had communicated it to him five years before it took place.

The ceremony of her abdication was a mournful solemnity, a mixture of pomp and sadness, in which scarce any eyes but her own were dry. She continued firm and composed through the whole; and, as soon as it was over, prepared to remove into a country more favourable to science than Sweden was. Concerning the merit of this action, the world has always been divided in opinion; it has been condemned alike both by the ignorant and the learned, the trifler and the sage. It was admired, however, by the great Conde: "How great was the magnanimity of this princess, (said he), who could so easily give up that for which the rest of mankind are continually destroying each other, and which so many, throughout their whole lives pursue, without attaining!" It appears, by the works of St Evremont, that the abdication of Christina was at that time the universal to-

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Christina.

pic of speculation and debate in France. Christina, besides abdicating her crown, abjured her religion: but this act was universally approved by one party and censured by another; the Papists triumphed, and the Protestants were offended. No prince, after a long imprisonment, ever shewed so much joy upon being restored to his kingdom, as Christina did in quitting hers. When she came to a little brook, which separates Sweden from Denmark, she got out of her carriage; and leaping to the other side, cried out in a transport of joy, "At last I am free, and out of Sweden, whither, I hope, I shall never return." She dismissed her women, and laid by the habit of her sex: "I would become a man," (said she); yet I do not love men because they are men, but because they are not women." She made her abjuration at Brussels; where she saw the great Conde, who, after his defection, made that city his asylum. "Cousin," (said she), who would have thought, ten years ago, that we should have met at this distance from our countries?"

The inconstancy of Christina's temper appeared in her going continually from place to place: from Brussels she went to Rome; from Rome to France, and from France she returned to Rome again; after this she went to Sweden, where she was not very well received; from Sweden she went to Hamburg, where she continued a year, and then went again to Rome; from Rome she returned to Hamburg; and again to Sweden, where she was still worse received than before; upon which she went back to Hamburg, and from Hamburg again to Rome. She intended another journey to Sweden; but it did not take place, any more than an expedition to England, where Cromwell did not seem well disposed to receive her; and after many wanderings, and many purposes of wandering still more, she at last died at Rome in 1689.

It must be acknowledged, that her journeys to Sweden had a motive of necessity; for her appointments were very ill paid, though the states often confirmed them after her abdication: but to other places she was led merely by a roving disposition; and, what is more to her discredit, she always disturbed the quiet of every place she came into, by exacting greater deference to her rank as queen than she had a right to expect, by her total non-conformity to the customs of the place, and by continually exciting and fomenting intrigues of state. She was indeed always too busy, even when she was upon the throne; for there was no event in Europe in which she was not ambitious of acting a principal part. During the troubles in France by the faction called the *Fronde*, she wrote with great eagerness to all the interested parties, officially offering her mediation to reconcile their interests, and calm their passions, the secret springs of which it was impossible she should know. This was first thought a dangerous, and afterwards a ridiculous behaviour. During her residence in France she gave universal disgust, not only by violating all the customs of the country, but by practising others directly opposite. She treated the ladies of the court with the greatest rudeness and contempt: when they came to embrace her, she, being in man's habit, cried

out, "What a strange eagerness have these women to kiss me! it is because I look like a man?"

But though she ridiculed the manners of the French court, she was very solicitous to enter into its intrigues. Lewis XIV. then very young, was enamoured of Mademoiselle de Mancini, niece to cardinal Mazarine; Christina flattered their passion, and offered her service. "I would fain be your confidant," (said she;) if you love, you must marry."

The murder of Monaldeschi is, to this hour, an inscrutable mystery. It is, however, of a piece with the expressions constantly used by Christina in her letters, with respect to those with whom she was offended; for the scarce ever signified her displeasure without threatening the life of the offender. "If you fail in your duty," (said she to her secretary, whom she sent to Stockholm after her abdication), not all the power of the king of Sweden shall save your life, though you should take shelter in his arms." A musician having quitted her service for that of the duke of Savoy, she was so transported with rage as to disgrace herself by these words, in a letter written with her own hand: "He lives only for me; and if he does not sing for me, he shall not sing long for any body."

Bayle was also threatened for having said that the letter which Christina wrote, upon the revocation of the edict of Nantes, was "a reman of Protestantism;" but he made his peace by apologies and submission. See the article BAYLE.

Upon the whole, she appears to have been an uncommon mixture of faults and great qualities; which, however it might excite fear and respect, was by no means amiable. She had wit, taste, parts, and learning: she was indefatigable upon the throne; great in private life; firm in misfortunes; impatient of contradiction; and, except in her love of letters, inconstant in her inclinations. The most remarkable instance of this fickleness is, That after she had abdicated the crown of Sweden, she intrigued for that of Poland. She was, in every action and pursuit, violent and ardent in the highest degree; impetuous in her desires, dreadful in her resentment, and fickle in her conduct. She says of herself, that "she was mistrustful, ambitious, passionate, haughty, impatient, contemptuous, satirical, incredulous, undevout, of an ardent and violent temper, and extremely amorous;" a disposition, however, to which, if she may be believed, her pride and her virtue were always superior. In general, her failings were those of her sex, and her virtues the virtues of ours.

Santa-CHRISTINA, one of the *MARQUESAS Islands*.

CHRISTMAS-DAY, a festival of the Christian church; observed on the 25th of December, in memory of the *nativity* or birth of Jesus Christ. As to the antiquity of this festival, the first footsteps we find of it are in the second century, about the time of the emperor Commodus. The decretal epistles indeed carry it up a little higher; and say that Telephorus, who lived in the reign of Antoninus Pius, ordered divine service to be celebrated, and an angelical hymn to be sung, the night before the nativity of our Saviour. However, that it was kept before the times of Constantine we have a melancholy proof: for whilst the persecution raged under Dioclesian, who then kept

Christina
|
Christmas.

Christo-
phers
Chromatic.

kept his court at Nicomedia, that prince, among other acts of cruelty, finding multitudes of Christians assembled together, to celebrate Christ's nativity, commanded the church-doors where they were met, to be shut, and fire to be put to it, which, in a short time, reduced them and the church to ashes.

CHRISTOPHERS, St. one of the Caribbee islands, in America, lying to the north-west of Nevis, and about 60 miles west of Antigua. It was formerly inhabited by the French and English; but, in 1713, it was ceded to the latter. It is about 20 miles in breadth, and 7 in length; and has high mountains in the middle, whence rivulets run down. Between the mountains are dreadful rocks, horrid precipices, and thick woods; and in the fourth-west part of the island, hot sulphurous springs at the foot of them. The air is good; the soil light, sandy, and fruitful; but the island is subject to hurricanes. The produce is chiefly sugar, cotton, ginger, indigo, and the tropical fruits. W. Long. 62.32. N. Lat. 17.30.

CHROASTACES, in natural history, a genus of pellicul gems, comprehending all those of variable colours, as viewed in different lights; of which kinds are the *opal* and the *asteria* or *oculus cati*. See *OPAL*, and *ASTERIA*.

CHROMATIC, a kind of music which proceeds by several semitones in succession. The word is derived from the Greek *χρῶμα*, which signifies colour. For this denomination several causes are assigned, of which none appear certain, and all equally unsatisfactory. Instead, therefore, of fixing upon any, we shall offer a conjecture of our own; which, however, we do not impose upon the reader, as more worthy of his attention than any of the former. *Χρῶμα* may perhaps not only signify a colour, but that shade of a colour by which it melts into another, or what the French call *nuance*. If this interpretation be admitted, it will be highly applicable to semitones; which being the smallest interval allowed in the diatonic scale, will most easily run one into another. To find the reasons assigned by the ancients for this denomination, and their various divisions of the chromatic species, the reader may have recourse to the same article in Rousseau's Musical Dictionary. At present, that species consists in giving such a procedure to the fundamental bass, that the parts in the harmony, or at least some of them, may proceed by semitones, as well in rising as descending; which is most frequently found in the minor mode, from the alterations to which the sixth and seventh note are subjected, by the nature of the mode itself.

The successive semitones used in the *chromatic* species are rarely of the same kind; but alternatively major and minor, that is to say, *chromatic* and *diatonic*: for the interval of a minor tone contains a minor or chromatic semitone, and another which is major or diatonic; a measure which temperament renders common to all tones: so that we cannot proceed by two minor semitones which are conjunctive in succession, without entering into the enharmonic species; but two major semitones twice follow each other in the *chromatic* order of the scale.

The most certain procedure of the fundamental bass to generate the chromatic elements in ascent, is alternately to descend by thirds, and rise by fourths, whilst all the chords carry the third major. If the fundamental bass proceeds from dominant to dominant by perfect cadences avoided, it produces the *chromatic* in descending. To produce both at once, you interweave the perfect and broken cadences, but at the same time avoid them.

As at every note in the *chromatic* species one must change the tone, that succession ought to be regulated and limited for fear of deviation. For this purpose, it will be proper to recollect, that the space most suitable to *chromatic* movements, is between the extremes of the dominant and the tonic in ascending, and between the tonic and the dominant in descending. In the major mode, one may also chromatically descend from the dominant upon the second note. This transition is very common in Italy; and, notwithstanding its beauty, begins to be a little too common amongst us.

The chromatic species is admirably fitted to express grief and affliction: these sounds boldly struck in ascending tear the soul. Their power is no less magical in descending; it is then that the ear seems to be pierced with real groans. Attended with its proper harmony, this species appears proper to express every thing: but its completion, by concealing the melody, sacrifices a part of its expression; and for this disadvantage, arising from the fullness of the harmony, it can only be compensated by the nature and genius of the movement. We may add, that, in proportion to the energy of this species, the composer ought to use it with greater caution and parsimony. Like those delicate viands, which, when profusely administered, immediately sicken us with their abundance: as much as they delight us when enjoyed with temperance, so much do they disgust when devoured with prodigality.

CHROMATIC, *Enharmonic*. See *ENHARMONIC*.

C H R O M A T I C S;

THAT part of optics which explains the several properties of the colours of light, and of natural bodies.

Different hypotheses concerning colours.

Before the time of Sir Isaac Newton, we find no hypothesis concerning colours of any consequence. The opinions of the old philosophers, however, we shall briefly mention, in order to gratify the curiosity of our readers. The Pythagoreans called colour the superficies

of body. Plato said that it was a flame issuing from them. According to Zeno, it is the first configuration of matter; and Aristotle said it was that which moved bodies actually transparent. Descartes asserted, that colour is a modification of light; but he imagined, that the difference of colour proceeds from the prevalence of the direct or rotatory motion of the particles of light. Father Grimaldi, Dechales, and many others,

thought the differences of colour depended upon the quick or slow vibrations of a certain elastic medium filling the whole universe. Rohault imagined, that the different colours were made by the rays of light entering the eye at different angles with respect to the optic axis; and from the phenomenon of the rainbow he pretended to calculate the precise quantity of the angle that constituted each particular colour. Lastly, Dr Hooke, the rival of Newton, imagined that colour is caused by the sensation of the oblique or uneven pulse of light; and this being capable of no more than two varieties, he concluded there could be no more than two primary colours.

2
This subject
investigated
by Sir Isaac
Newton.

In the year 1666, Sir Isaac Newton began to investigate this subject; and finding the coloured image of the sun, formed by a glass prism, to be of an oblong, and not of a circular form, as, according to the laws of refraction, it ought to be, he began to conjecture that light is not *homogeneous*; but that it consists of rays, some of which are much more refrangible than others. See this discovery fully explained and ascertained under the article OPTICS.

This method of accounting for the different colours of bodies, for their reflecting this or that kind of rays most copiously, is so easy and natural, that Sir Isaac's system quickly overcame all objections, and to this day continues to be almost universally believed. It is now acknowledged, that the light of the sun, which to us seems perfectly homogeneous and white, is composed of no fewer than seven different colours, *viz.* red, orange, yellow, green, blue, purple, and violet or indigo. A body which appears of a red colour, hath the property of reflecting the red rays more powerfully than any of the others; and so of the orange, yellow, green, &c. A body which is of a black colour, instead of reflecting, *absorbs* all or the greatest part of the rays that fall upon it; and, on the contrary, a body which appears white, reflects the greatest part of the rays indiscriminately, without separating the one from the other.

The foundation of a rational theory of colours being thus laid, it next became natural to inquire, by what peculiar mechanism in the structure of each particular body it was fitted to reflect one kind of rays more than another. This Sir Isaac Newton attributes to the density of these bodies. Dr Hooke had remarked, that thin transparent substances, particularly water and soap blown into bubbles, exhibited various colours according to their thinness; though, when they have a considerable degree of thickness, they appear colourless; and Sir Isaac himself had observed, that as he was compressing two prisms hard together, in order to make their sides (which happened to be a little convex) to touch one another, in the place of contact they were both perfectly transparent, as if they had been but one continued piece of glass. Round the point of contact, where the glasses were a little separated from each other, rings of different colours appeared. To observe more nicely the order of the colours produced in this manner, he took two object-glasses; one of them a plano-convex one belonging to a 14 foot reflecting telescope, and the other a large double convex one for a telescope of about 50 feet; and laying the former of them upon the latter, with its plain side

3
Colours appearing
between two
glass plates.

downwards, he pressed them slowly together; by which means the colours very soon emerged, and appeared distinct to a considerable distance. Next to the pellucid central spot, made by the contact of the glasses, succeeded blue, white, yellow, and red. The blue was very little in quantity, nor could he discern any violet in it; but the yellow and red were very copious, extending about as far as the white, and four or five times as far as the blue. The next circuit immediately surrounding these, consisted of violet, blue, green, yellow, and red: all these were copious and vivid except the green, which was very little in quantity, and seemed more faint and dilute than the other colours. Of the other four the violet was the least in extent; and the blue less than the yellow or red. The third circle of colours was purple, blue, green, yellow, and red. In this the purple seemed more reddish than the violet in the former circuit, and the green was more conspicuous; being as brisk and copious as any of the other colours, except the yellow; but the red began to be a little faded, inclining much to purple. The fourth circle consisted of green and red; and of these the green was very copious and lively, inclining on the one side to blue, and on the other to yellow; but in this fourth circle there was neither violet, blue, nor yellow, and the red was very imperfect and dirty. All the succeeding colours grew more and more imperfect and dilute, till, after three or four revolutions, they ended in perfect whiteness.

4
As the colours were thus found to vary, according to the different distances of the glass-plates from each other, our author thought that they proceeded from the different thickness of the plate of air intercepted between the glasses; this plate of air, being by the mere circumstance of thinness or thickness, disposed to reflect or transmit this or that particular colour. From this he concluded, as already observed, that the colours of all natural bodies depended on their density, or the bigness of their component particles. He also constructed a table wherein the thickness of a plate necessary to reflect any particular colour was expressed in parts of an inch divided into 1,000,000 parts.

5
Sir Isaac Newton, pursuing his discoveries concerning the colours of thin substances, found that the same were also produced by plates of a considerable thickness. There is no glass or speculum, he observes, how well polished soever, but, besides the light which it refracts or reflects regularly, scatters every way irregularly a faint light; by means of which the polished surface, when illuminated in a dark room by a beam of the sun's light, may easily be seen in all positions of the eye. It was with this scattered light that the colours in the following experiments were produced.

Colours by
reflection.

The sun shining into his darkened chamber through a hole in the shutter one inch wide, he let the beam of light fall perpendicularly upon a glass speculum concave on one side and convex on the other, ground to a sphere of five feet eleven inches radius, and quicksilver over on the convex side. Then, holding a quire of white paper at the centre of the sphere to which the speculum was ground, in such a manner as that the beam of light might pass through a little hole made in the middle of the paper, to the speculum, and thence

be

be reflected back to the same hole, he observed on the paper four or five concentric rings of colours, like rainbows surrounding the hole, very much like those which appeared in the thin plates above-mentioned, but larger and fainter. These rings, as they grew larger and larger, became more dilute, so that the fifth was hardly visible; and yet sometimes, when the sun shone very clear, there appeared faint traces of a sixth and seventh.

We have already taken notice, that the thin plates made use of in the former experiments reflected some kinds of rays in particular parts, and transmitted others in the same parts. Hence the coloured rings appeared variously disposed, according as they were viewed by transmitted or reflected light; that is, according as the plates were held up between the light and the eye, or not. For the better understanding of which we subjoin the following table, wherein on one side are mentioned the colours appearing on the plates by reflected light, and on the other those which were opposite to them, and which became visible when the glasses were held up between the eye and the window. We have already observed, that the centre, when the glasses were in full contact, was perfectly transparent. This spot, therefore, when viewed by reflected light, appeared black, because it transmitted all the rays; and for the same reason it appeared white when viewed by transmitted light.

COLOURS by Reflected Light.

Black
Blue
White
Yellow
Red
Violet
Blue
Green
Yellow
Red
Purple
Blue
Green
Yellow
Green
Red
Green
Red
Greenish-blue
Red.

COLOURS by Transmitted Light.

White
Yellowish-red
Black
Violet
Blue
White
Yellow
Red
Violet
Blue
Green
Yellow
Red
Bluish-green
Red
Bluish-green
Red.

The colours of the rings produced from reflection by the thick plates, followed the order of those produced by transmission through the thin ones; and by the analogy of their phenomena with those produced from the thin plates, Sir Isaac Newton concluded that they were produced in a similar manner. For he found, that if the quicksilver was rubbed off from the back of the speculum, the glass alone would produce the same rings, but much more faint than before; so that the phenomenon did not depend upon the quicksilver, except in as far as, by increasing the reflexion at the back of the glass, it increased the light of the coloured rings. He also found that a speculum of metal only, produced none of those rings; which made

him conclude, that they did not arise from one surface only, but depended on the two surfaces of the plate of glass of which the speculum was made, and upon the thickness of the glass between them.

From these experiments and observations, it will be easy to understand the Newtonian theory of colours. Every substance in nature seems to be transparent, provided it is made sufficiently thin. Gold, the most dense substance we know, when reduced into thin leaves, transmits a bluish green light through it. If therefore we suppose any body, gold, for instance, to be divided into a vast number of plates, so thin as to be almost perfectly transparent, it is evident, that all or greatest part of the rays will pass through the upper plates, and when they lose their force will be reflected from the under ones. They will then have the same number of plates to pass through, which they had penetrated before; and thus, according to the number of those plates through which they are obliged to pass, the object appears of this or that colour, just as the rings of colours appeared different in the experiment of the two plates, according to their distance from one another, or the thickness of the plate of air between them.

This theory is adopted by Edward Huxley Delaval, in his Experimental Inquiry into the cause of the changes of colours in opaque and coloured bodies. He endeavours to confirm it by a number of experiments on the infusions of flowers of different colours; but his strongest arguments seem to be those derived from the different tinges given to glass by metallic substances. Here he observes, that each metal gives a tinge according to its specific density; the more dense metals producing the less refrangible colours, and the lighter ones those colours which are more easily refrangible. Gold, which is the densest of all metals, imparts a red colour to glass, whenever it can be divided into particles so minute, that it is capable of being mixed with the materials of which glass is made. It seems indifferent by what means it is reduced to this state, nor can it by any means be made to produce another colour. If it is mixed in large masses without being minutely divided, it imparts no colour to the glass, but remains in its metallic form. Lead, the metal whose density is next in order to that of gold, affords a glass of the colour of the hyacinth; a gem whose distinguishing characteristic is, that it is red with an admixture of yellow, the same colour which is usually called *orange*. Glass of lead is mentioned by several authors as a composition proper, without the addition of any other ingredient, for imitating the hyacinth. Silver, next in density to lead, can only be made to communicate a yellow colour to glass. If the metal is calcined with sulphur, it readily communicates this colour. Leaf-silver laid upon red-hot glass likewise tinges it yellow. When we meet with authors who mention a blue or greenish colour communicated by silver, the cause must have been, that the silver used in such processes was mixed with copper. Mr Delaval assures us, from his own experience, that silver purified by the test retains so much copper, that, when melted several times with nitre and borax, it always imparted a green colour at the first and second melting; though afterwards no such

General theory of colours by Sir Isaac Newton.

Mr Delaval's experiments in confirmation of it.

Colours by refraction and reflection enumerated.

such colour was obtainable from it. The only colour produced by copper is green. It is indifferent in what manner the copper is prepared in order to tinge the glass, provided it is exposed without any other ingredient to a sufficient degree of heat. If a quantity of salts are added in the preparation, they will, by attenuating the mixture, make the glass incline to blue, the colour next in order; but this happens only when the fire is moderate: for, in a greater degree of heat, the redundant salts, even those of the most fixed nature, are expelled. It is true, that copper is mentioned by some writers as an ingredient in red glass and enamel: but the red, which is the colour of the metal not dissolved or mixed with the glass, remains only while the composition is exposed to such a degree of heat as is too small to melt and incorporate it; for, if it be suffered to remain in the furnace a few minutes after the copper is added, the mass will turn out green instead of red. Iron, the metal next in density to copper, is apt to be calcined, or reduced to a ruddy crocus, similar to that rust which it contracts spontaneously in the air. In this state it requires a considerable degree of heat to dissolve and incorporate it with glass: till that heat is applied, it retains its ruddy colour: by increasing the heat, it passes through the intermediate colours, till it arrives at its permanent one which is blue; this being effected in the greatest degree of heat the glass will bear, without losing all colour whatever. Iron vitrified *per se*, is converted into a blue glass. In short, it is indubitable, that iron is the only metal which will, without any addition, impart to the glass a blue colour: for copper will not communicate that colour without the addition of a considerable quantity of salts, or some other matter that attenuates it; and the other metals cannot by any means be made to produce it at all.

9
Sir Isaac's
theory de-
fended by
Dr Priest-
ley.

These are the principal of Mr Delaval's arguments in favour of Sir Isaac Newton's theory of colours being formed by density. Dr Priestley too hath mentioned some which deserve attention. "It was a discovery of Sir Isaac Newton, (says he), that the colours of bodies depend upon the thickness of the fine plates which compose their surfaces. He hath shown, that a change of the thickness of these plates occasions a change in the colour of the body; rays of a different colour being thereby disposed to be transmitted through it; and consequently rays of a different colour reflected at the same place, so as to present an image of a different colour to the eye. A variation in the density occasions a variation in the colour; but still a medium of any density will exhibit all the colours, according to the thickness of it. These observations he confirmed by experiments on plates of air, water, and glass. He likewise mentions the colours which arise on polished steel by heating it, as likewise on bell-metal, and some other metalline substances, when melted and poured on the ground, where they may cool in the open air; and he ascribes them to the scorie or vitrified parts of the metal, which, he says, most metals, when heated or melted, do continually protrude and send out to their surfaces, covering them in the form of a thin glassy skin. This great discovery concerning the colours of bodies depending on the thickness of the fine plates which compose their

surfaces, of whatever density these plates may be, I have been so happy as to hit upon a method of illustrating and confirming by means of electrical explosions. A number of these being received on the surface of any piece of metal, change the colour of it to a considerable distance from the spot on which they were discharged; so that the whole circular space is divided into a number of concentric rings, each of which consists of all the prismatic colours, and perhaps as vivid as they can be produced in any method whatever. Upon shewing these coloured rings to Mr Canton, I was agreeably surprised to find, that he had likewise produced all the prismatic colours from all the metals, but by a different operation. He extended fine wires of all the different metals along the surfaces of pieces of glass, ivory, wood, &c.; and when the wire was exploded, he always found them tinged with all the colours. They are not disposed in so regular and beautiful a manner as in the rings I produced, but they equally demonstrate that none of the metals thus exploded discovers the least preference to one colour more than to another. In what manner these colours are formed may not be easy to conjecture. In Mr Canton's method of producing them, the metal, or the calcined and vitrified parts of it seem to be dispersed in all directions from the place of explosion, in the form of spheres of a very great variety of sizes, tinged with all the variety of colours, and some of them smaller than can be distinctly seen by any magnifier. In my method of making these colours, they seem to be produced in a manner similar to the production of colours on steel and other metals by heat; *i. e.* the surface is affected without the parts of it being removed from their places, certain plates or laminae being formed of a thickness proper to exhibit the respective colours."

But, however well supported this doctrine of the formation of colours by density may be, we find the same author (Dr Priestley), whom we have just now seen arguing for it in his history of electricity, arguing against it in his history of vision. "There are (says he) no optical experiments with which Sir Isaac Newton seems to have taken more pains than those relating to the rings of colours which appear in thin plates; and in all his observations and investigations concerning them, he discovers the greatest sagacity both as a philosopher and mathematician; and yet in no subject to which he gave his attention, does he seem to have overlooked more important circumstances in the appearances he observed, or to have been more mistaken with regard to their causes. The former will be evident from the observations of those who succeeded him in these inquiries, particularly those of the Abbe Mazeas. This gentleman, endeavouring to give a very high polish to the flat side of an object-glass, happened to be rubbing it against another piece of flat and smooth glass; when he was surprised to find, that after this friction, they adhered very firmly together, till at last he could not move the one upon the other. But he was much more surprised to observe the same colours between these plane glasses that Newton observed between the convex object-glass of a telescope and another that was plane. These colours between the plane glasses, the Abbe observed, were in proportion

10
His experi-
ments.

11
Mr Can-
ton's expe-
riments.

12
Newtonian
theory im-
pugned by
Dr Priest-
ley.

13
Curious ex-
periments by
the Abbe
Mazeas.

tion to their adhesion. The resemblance between them and the colours produced by Newton induced him to give a very particular attention to them; and his observations and experiments are as follow:

"If the surfaces of the pieces of glass are transparent, and well polished, such as are used for mirrors, and the pressure be as equal as possible on every part of the two surfaces, a resistance, he says, will soon be perceived when one of them is made to slide over the other; sometimes towards the middle, and sometimes towards the edges; but wherever the resistance is felt, two or three very fine curve lines will be perceived, some of a pale red, and others of a faint green. Continuing the friction, these red and green lines increase in number at the place of contact, the colours being sometimes mixed without any order, and sometimes disposed in a regular manner. In the last case, the coloured lines are generally concentric circles, or ellipses; or rather ovals, more or less elongated as the surfaces are more or less united. These figures will not fail to appear, if the glasses are well wiped and warmed before the friction.

"When the colours are formed, the glasses adhere with considerable force, and would always continue so without any change in the colours. In the centre of all those ovals, the longer diameter of which generally exceeds ten lines, there appears a small plate of the same figure, exactly like a plate of gold interposed between the glasses; and in the centre of it there is often a dark spot, which absorbs all the rays of light except the violet; for this colour appears very vivid through a prism.

"If the glasses are separated suddenly, either by sliding them horizontally over one another, or by the action of fire, as will be explained hereafter, the colours will appear immediately upon their being put together again, without the least friction.

"Beginning by the slightest touch, and increasing the pressure by insensible degrees, there first appears an oval plate of a faint red, and in the midst of it a spot of light green, which enlarges by the pressure, and becomes a green oval, with a red spot in the centre; and this, enlarging in its turn, discovers a green spot in its centre. Thus the red and the green succeed one another in turns, assuming different shades, and having other colours mixed with them, which will be distinguished presently.

"The greatest difference between these colours exhibited between plane surfaces and those formed by curve ones is, that in the former case pressure alone will not produce them, except in the case above mentioned. With whatever force he compressed them, his attempts to produce the colours were in vain without previous friction. But the reason of this plainly was, that without sliding one of the glasses over the other, they could not be brought to approach near enough for the purpose.

"Having made these observations with plates of glass whose sides were nearly parallel, he got two prisms with very small refracting angles; and rubbing them together, when they were so joined as to form a paralleloiped, the colours appeared with a surprising lustre at the places of contact, owing, he did not doubt, to the separation of the rays of light

by the prism. In this case, differently coloured ovals appeared, but the plate of gold in them was much whiter, and only appeared yellow about its edges. This plate having a black spot in its centre, was bordered by a deep purple. He could not perceive any violet by his naked eye, but it might be perceived by the help of a lens with a weak light. It appeared in a very small quantity at the confines of the purple and the blue, and seemed to him to be only a mixture of these two colours. It was very visible in each of the coloured rings by inclining the glasses to the light of the moon. Next to the purple and violet appeared blue, orange, red tinged with purple, light green, and faint purple. The other rings appeared to the naked eye to consist of nothing but faint reds and greens; and they were so shaded that it was not easy to mark their terminations. That the order of these may be compared with Newton's, he gives a view of both in the following table:

Order of the Colours in the Plane Glasses.		Order of the Colours in Newt. Object Glasses.
Order I.	{ Black spot	Black
	{ Whitish oval	Blue
	{ Yellow border	White
	{ Deep purple	Yellow
Order II.	{ Blue	Red
	{ Orange	Violet
	{ Purple	Blue
		Green
Order III.	{ Greenish blue	Yellow
	{ Yellowish green	Red
	{ Purplish red	Purple
		Blue
Order IV.	{ Green	Green
	{ Red	Red
Order V.	{ Faint green	Greenish blue
	{ Faint red	Red
Order VI.	{ Weak green	Greenish blue
	{ Light red	Red
Order VII.	{ Very faint green	Greenish blue
	{ Very faint red.	Pale red

"When these coloured glasses were suspended over the flame of a candle, the colours disappeared suddenly, though the glasses still continued to adhere to one another when they were parallel to the horizon. When they were suffered to cool, the colours returned by degrees to their former places, in the order of the preceding table.

"After this the Abbe took two plates much thicker than the former, in order to observe at his leisure the action of fire upon the matter which he supposed to produce the colours; and observed, that as they grew warm, the colours retired to the edges of the glasses, and there became narrower and narrower till they were reduced to imperceptible lines. Withdrawing the flame, they returned to their place. This experiment he continued till the glasses were bent by the violence of the heat. It was pleasant, he says, to observe these colours glide over the surface of the glass as they were pursued by the flame.

"At

"At the first, our author had no doubt but that these colours were owing to a thin plate of air between the glasses, to which Newton has ascribed them; but the remarkable difference in the circumstances attending those produced by the flat plates, and those produced by the object-glasses of Newton, convinced him that the air was not the cause of this appearance. The colours of the flat plates vanished at the approach of flame, but those of the object-glasses did not. He even heated the latter till that which was next the flame was cracked by the heat, before he could observe the least dilatation of the coloured rings. This difference was not owing to the plane glasses being less compressed than the convex ones; for though the former were compressed ever so much by a pair of forceps, it did not in the least hinder the effect of the flame.

"Afterwards he put both the plane glasses and the convex ones, into the receiver of an air-pump, suspending the former by a thread, and keeping the latter compressed by two strings; but he observed no change in the colours of either of them in the most perfect vacuum he could make.

"Notwithstanding these experiments seemed to be conclusive against the hypothesis of these colours being formed by a plate of air, the Abbe frankly acknowledges, that the air may adhere so obliquately to the surface of the glasses as not to be separated from them by the force of the pump; which, indeed, is agreeable to other appearances: but the following experiments of our author make it still more improbable that the air should be the cause of these colours.

"To try the utmost effect of heat upon these coloured plates, after warming them gradually, he laid them upon burning coals; but though they were nearly red, yet when he rubbed them together, by means of an iron rod, he observed the same coloured circles and ovals as before. When he ceased to press upon them, the colours seemed to vanish; but, when he repeated the friction, they returned, and continued till the pieces of glass began to be red-hot, and their surfaces to be united by fusion.

"When the outward surface of one of his plates of glass was quicksilvered, none of those colours were visible, though the glasses continued to adhere with the same force. This he ascribed to the stronger impression made on the eye by the greater quantity of light reflected from the quicksilver.

"Judging from the resemblance between his experiments and those of Sir Isaac Newton, that the colours were owing to the thickness of some matter, whatever that was, interposed between the glasses, the Abbe, in order to verify his hypothesis, tried the experiment on thicker substances. He put between his glasses a little ball of suet, about a fourth of a line in diameter, and pressed it between the two surfaces, warming them at the same time, in order to disperse the suet; but, though he rubbed them together as before, and used other soft substances besides suet, his endeavours to produce the colours had no effect. But, rubbing them with more violence in a circular manner, he was surprised, on looking at a candle through them, to see it surrounded with two or three concentric rings, very broad, and with very lively delicate

colours; namely, a red inclining to a yellow, and a green inclining to that of an emerald. At that time he observed only these two colours; but continuing the friction, the rings assumed the colours of blue, yellow, and violet, especially when he looked through the glasses on bodies directly opposed to the sun. If, after having rubbed the glasses, the thickness was considerably diminished, the colours grew weaker by transmitted light, but they seemed to be much stronger by reflection, and to gain on one side what they lost on the other.

"Our author was confirmed in his opinion, that there must be some error in Newton's hypothesis, by considering, that, according to his measures, the colours of the plates varied with the difference of a millionth part of an inch, whereas he was satisfied that there must have been much greater differences in the distance between his glasses, when the colours remained unchanged.

"If the colour depended upon the thickness only, he thought that the matter interposed between the glasses ought to have given the same colour when it was reduced to a thin plate by simple fusion as well as by friction, and that, in rubbing two plates together, warming them at different times, and compressing them with a considerable force, other colours would have appeared besides those above-mentioned.

"These circumstances made him suspect, that the different thicknesses of the substance interposed between the glasses served only to make them more or less transparent, which was an essential condition in the experiment; and he imagined that the friction diffused over the surface of the thin substance a kind of matter on which the colours are formed by reflected light; for when he held the plates (which gave the colours when the suet was between them) over the flame of a small candle, the colours fled with great precipitation, and returned to their place without his being able to perceive the least alteration in the suet.

"He was confirmed in his conjectures, by frequently observing, that when the glasses were separated, at the moment the colours disappeared, they were covered with the same greasy matter, and that it seemed to be in the very same state as when they were separated without warming. Besides, having often repeated the same experiment with different kinds of matter, he found that the degree of heat that dispersed the colours was not always sufficient to melt it; which difference was more sensible in proportion as the matter interposed was made thinner.

"Instead of the suet, he sometimes made use of Spanish wax, resin, common wax, and the sediment of urine. He began with Spanish wax, on account of its remarkable transparency in Mr Hauksbee's electrical experiments; but he had much difficulty in making it sufficiently thin by friction, being often obliged to warm his glasses, to seize the moment of fusion, which continued but a short time, and to hazard the burning of his fingers.

"The experiment at length succeeding, the Spanish wax appeared with its opacity and natural colour when it reflected the light, but they both disappeared in the transmitted light. He observed the same rings in it as in the suet; and indeed he could perceive but

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Newtonian
hypothesis
opposed.

little difference between the colours of suet, Spanish wax, common wax, or resin; except that this last substance did not make the colours so vivid, on account of the too great transparency of its particles.

"The sediment of urine had something more particular in its appearance, as its colours were more lively. Holding it above the flame, its colours disappeared; and, keeping it in that situation, there were formed, upon its surface, ramifications, like those of the hoar-frost, which disappeared as the glasses grew cold. There were the same ramifications both upon the suet and the wax, but they were not so considerable. The glasses which had Spanish wax and resin between them adhered with so much force, that they could not be separated without the help of fire; and when they began to grow warm, they separated with a noise like that of a glass breaking in the fire, though the glasses were not broken, and the matter between them was not melted.

"Separating the glasses which he first used very suddenly, he observed upon their surface very thin vapours, which formed different colours, but presently vanished altogether.

"To try the effect of vapour, he breathed upon one of his plates of glass, and observed that the vapours which adhered to the glasses sometimes formed, before they were entirely dispersed, a surprising variety of colours. This experiment, he observes, does not always succeed at the first trial. The glass must be breathed upon several times, and care must be taken to wipe it every time with one's hand, both to take off the moisture, and also to make upon the glass a kind of furrows, which contribute very much to the variety of colours, by making inequalities in the thicknesses of the vapours. It is necessary, also, that the glasses on which these experiments are made have no quicksilver upon them.

"When the particles of water which formed this vapour were too thick to exhibit these colours, he struck them several times with his pencil, in order to attenuate them; and then he saw an infinity of small coloured threads which succeeded one another with great rapidity.

"Putting a drop of water between two pieces of common glass, he observed that the compression of them produced no colour; but if, while they were compressed, the water was made to pass from one place to another, it left behind it large spots, red, yellow, green, purple, &c. and the spots assumed different colours with a surprising rapidity, and presented to the eye a most beautiful variety of shades.

"In order to determine with greater certainty whether they were vapours that caused the colours in his first observations, he first breathed upon one of his plates of glass, and then rubbed them against one another, when the colours appeared in the same order as before, but darker, and dispersed in confusion in the places occupied by the vapours; but when he made use of fire to dissipate the watery particles, the colours resumed their lustre.

"Newton, having introduced a drop of water between his two object-glasses, observed, that in proportion as the water insinuated itself between the glasses, the colours grew fainter, and the rings were

contracted; and ascribing these colours to the thickness of the plate of water, as he ascribed the former to that of the plate of air, he measured the diameters of the coloured rings made by the plate of water, and concluded that the intervals between the glasses at the similar rings of these two mediums were nearly as three to four; and thence he inferred that, in all cases, these intervals would be as the sines of the refractions of these mediums.

"The Abbe Mazeas, in order to assure himself whether, agreeable to this rule, the coloured rings of his glasses depended upon the thickness of the water only, dipped one of the edges of his coloured glasses in a vessel of water, having taken care to wipe and warm them well before he produced his colours by friction. The water was a considerable time in rising as high as the glasses; and in proportion as it ascended, he perceived a very thin plate of water, which seemed to pass over the matter, which he thought produced the colours, without mixing with it; for beyond this plate of water, he still perceived the colours in the same place and order, but deeper and darker; and holding the glasses above the flame of a candle, he saw the colours go and come several times as he moved them nearer to or further from the flame. He then moistened both the glasses more than before; and rubbing them as usual, he always saw the same appearance; and seizing the moment when the colours had disappeared to separate the glasses, he always found that they were wet. On this account, he thought that it could not be the water on which the colour depended, but some substance much more sensible to heat. He also thought that these coloured rings could not be owing to the compression of the glasses; or that, if this circumstance did contribute any thing to them, it served rather to modify than to generate them.

"M. du Tour gave particular attention to the preceding observations of the Abbe Mazeas. He repeated the experiments with some variation of circumstances, particularly comparing them with those of Sir Isaac Newton. He is so far from supposing a plate of air to be necessary to the formation of these coloured rings, that he thinks the reason of their not appearing between the flat plates of glass is the adhering of the air to their surfaces; and that mere pressure is not sufficient to expel it; except, as the Abbe Mazeas observed, the rings had before been made in the same place; in which case, simple apposition without friction is sufficient; the air, probably, not having had time to apply itself so closely to the surface of the glass. The contact of some other substances, M. du Tour observes, is not so prejudicial in this experiment as that of air; for he found, that, if he only gave the plates a slight coating of any kind of grease, the rings would appear without friction. Also dipping them slightly in water, or wiping them with his finger, would answer the same purpose. He verified his conjectures by means of the air-pump; for, dipping two pieces of glass in water, one of which had been wiped, and the other not, the former appeared to have no bubbles adhering to it when the air was exhausted, whereas the other had.

"When one of the glasses is convex, our author ob-

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M. du
Tour's ob-
servations.

serves, that the particles of air may more easily make their escape by pressure only; whereas their retreat is in a manner cut off when they are compressed between two flat surfaces. The air-pump, he found, was not able to detach these particles of air from the surfaces to which they adhere; leaving these flat plates for a considerable time in an exhausted receiver, was not sufficient to prepare them so well for the experiment, as wiping them.

16
Experiments on colours by reflection.

"Besides the observations on the colours of thin plates, it has been seen that Sir Isaac Newton imagined he could account for the colours exhibited by thick ones in some cases in a similar manner; particularly in those curious experiments in which he admitted a beam of light through a hole in a piece of pasteboard, and observed the rings of colours reflected back upon it by a concave glass mirror of equal thickness in all places. These experiments were refused, and happily pursued by the Duke de Chaulnes, who ascribed these colours to the inflection of light*. Chance led the duke to observe, that when the nearer surface of the glass mirror was clouded by breathing upon it, so as lightly to tarnish it, a white diffused and vivid light was seen upon the pasteboard, and all the colours of the rings became much stronger, and more distinct. This appearance he made constant by moistening the surface of the mirror with a little milk and water, and suffering it to dry upon it.

"In all his experiments upon this subject, he found, that when the rays fell converging on the surface of the mirror, the rings were hardly visible; when they fell parallel upon it, as they must have done in all the experiments of Newton, they appeared sufficiently distinct; but when, by means of a convex lens placed in the hole of the window, they were made to diverge from the centre of the sphere to which the mirror was ground, so that they fell perpendicularly on the surface of the mirror, the colours were as vivid as he could make them. In this case he could remove the reflected image to a great distance from the hole, without making the rings disappear; and he could plainly perceive them to arise from their central spots, which changed their colours several times.

"The effect of tarnishing the mirror convinced him, that these coloured rings depended on the first surface of the mirror; and that the second surface, or that which reflected them after they had passed the first, only served to collect them and throw them upon the pasteboard in a quantity sufficient to make them visible, and he was confirmed in his supposition by the following experiments.

"He took a plano-convex object-glass, of six feet focus, and placed it six feet from the pasteboard with its convex side towards it. By this means the rays which fell upon that surface, after being refracted there, were transmitted through the thickness of the glass, parallel to one another, and fell perpendicularly on the plane surface that reflected them, and, in their return, would be collected upon the pasteboard. In these circumstances the rings appeared very distinct after he had tarnished the convex surface, which in this position was next to the light.

"Turning the same glass the contrary way, so that the plane surface was towards the pasteboard, he could

perceive none of the rings at the distance of six feet; but they were visible at the distance of three feet: because at that distance the second surface reflected the rays by its concavity directly towards the pasteboard.

"These two experiments demonstrate the use of the second surface of the mirror, and shew the manner of placing it to most advantage. Those that follow shew the use of the first surface with respect to these rings; and he was led to make them by the casual observation above-mentioned.

"Newton, he observes, had remarked that when he made use of a mirror of the same focus with the first he had used, but of twice the thickness, he found the diameter of the rings much smaller than before. This observation the duke thought favourable to his own conclusions; for if these rings depend upon the first surface, the nearer it is to the second, which only reflects the ray transmitted from it, the larger they ought to appear upon the pasteboard.

"To ascertain this fact, he thought of making use of two moveable surfaces; and to make use of a micrometer to measure the distance between them with exactness. For this purpose he took a metallic mirror belonging to a reflecting telescope, being part of a sphere of ten feet radius; and he fixed it firm upon a foot in which was a groove that carried a light frame, to which was fastened a thin piece of talc tarnished with milk and water. The frame that supported the piece of talc could either be brought into contact with the mirror, or be removed to the distance of eight or nine inches from it, and the micrometer shewed to the utmost exactness the least motion of the frame.

"Having placed this mirror ten feet from the pasteboard, that is, at the distance of the radius of its own sphere, he observed the rings to appear very distinct; the form of his mirror being very true; but the diameter of the rings upon the pasteboard varied with the distance of the talc from the mirror, so that they were very large when the talc was near the mirror, and very small when it was placed at the distance of seven or eight inches.

"These experiments proved, that the rings were formed by the first surface, and reflected by the second; but it still remained to be determined in what manner they were formed. He imagined, that the small pencils of rays that were transmitted through the pores of the glass, or any other transparent substance, might suffer a kind of inflection, which might change the cylinder which they formed into a truncated cone, either by means of their different degrees of inflexibility, or by the different distances at which they pass by the edges of the small hole through which they are transmitted. Pursuing this idea, he thought of making use of some body, the pores of which were of a known and determined shape. Instead, therefore, of the piece of talc, he placed a piece of fine linen in the above mentioned frame, stretching it as even as possible, to make the pores formed by the threads more exact and more permeable by the light; and he soon found, with great pleasure, that his conjecture was verified: for, instead of the circular rings which he had before, they were now manifestly square, though their angles were a little rounded; and they were

* See Optics.

were coloured as the others, though the light was not very vivid, on account of the quantity that was stopped by the mullin.

"When, instead of the mullin, he stretched across his frame fine silver wires exactly parallel, at the distance of about three quarters of a line, or a whole line from one another, without any other wires across them; instead of the rings which he had seen before, there was nothing upon the pasteboard but a gleam of white light divided by many small streaks, coloured in a very vivid manner, and in the same manner as the rings."

Thus we have another hypothesis of the formation of colours, namely, by the inflection of light in its passage out from between the solid and impenetrable particles of which bodies are composed. It is, however, very difficult, upon the hypothesis either of Sir Isaac Newton, or that of the Duke de Chaulnes, to give a reason why bodies that are not entirely white, should not appear variously coloured. For, it appears from Sir Isaac Newton's experiments, that plates of different density are capable of exhibiting the same colours; and that where a plate is continually varying in density, it will produce all the colours. Now it is evident, that the plates of which we suppose all natural bodies to be composed must be similar to one that is perpetually varying in its thickness; for supposing the plates of which any substance is composed, to be of any determinate thickness, $\frac{9}{10}$ millionth parts of an inch for instance; such of the rays as are reflected from this plate will be red. But if any of them penetrate to the depth of $11\frac{1}{2}$ of these parts, they will be reflected of a violet colour, &c. and thus must alloy and obscure the red; and so of others. If we suppose the colours to be produced by inflection, it will be equally difficult to account for some particular rays being inflected and others not; seeing we observe that all of them are capable of being inflected by every substance whatever, when they pass very near it. In some cases too, colours are produced when the light is neither refracted nor inflected as far as we can judge; and this seems to obscure the theory of chromatics more than any thing we have yet mentioned.

As the experiments we are now about to mention are of the greatest importance, and in direct terms contradict one of Sir Isaac Newton's, we shall give a full account of them, from Priestley's history of Vision, &c. with his remarks thereon.

The experiment in question is the eighth of Newton's second book of Optics: "He (Sir Isaac Newton) found, he says, that when light goes out of air through several contiguous refracting mediums, as through water and glass, and thence goes out again into air, whether the refracting surfaces be parallel or inclined to one another, that light, as often as, by contrary refractions, it is so corrected, that it emerges in lines parallel to those in which it was incident, continues ever after to be white; but if the emergent rays be inclined to the incident, the whiteness of the emerging light will, by degrees, in passing on from the place of emergence, become tinged at its edges with colours. This he tried by refracting light with prisms of glass, placed within a prismatic vessel of water.

"By Theorems deduced from this experiment, he infers, that the refraction of the rays of every sort, made out of any medium into air, are known by having the refraction of the rays of any one sort; and also, that the refraction out of one medium into another is found as often as we have the refractions out of them both into any third medium.

"On the contrary, a Swedish philosopher, (M. Klingenshierna) observes *, that, in this experiment, the rays of light, after passing through the water and the glass, though they come out parallel to the incident rays, will be coloured; but that the smaller the glass prism is, the nearer will the result of it approach to Newton's description.

"This paper of M. Klingenshierna, being communicated to Mr Dollond by M. Mallet, made him entertain doubts concerning Newton's report of the result of his experiment; and determined him to have recourse to experiments of his own.

"He therefore cemented together two plates of parallel glass, at their edges, so as to form a prismatic vessel when stopped at the ends or bases; and the edge being turned downwards, he placed in it a glass prism with one of its edges upwards, and filled up the vacancy with clear water; so that the refraction of the prism was contrived to be contrary to that of the water, in order that a ray of light, transmitted through both these refracting mediums, might be affected by the difference only between the two refractions. As he found the water to refract more or less than the glass prism, he diminished or increased the angle between the glass plates, till he found the two contrary refractions to be equal, which he discovered by viewing an object through this double prism. For when it appeared neither raised nor depressed, he was satisfied that the refractions were equal, and that the emergent rays were parallel to the incident.

"Now, according to the prevailing opinion, he observes, that the object should have appeared through this double prism in its natural colour; for if the difference of refrangibility had been in all respects equal, in the two equal refractions, they would have rectified each other. But this experiment fully proved the fallacy of the received opinion, by shewing the divergency of the light by the glass prism to be almost double of that by the water; for the image of the object, though not at all refracted, was yet as much infected with prismatic colours, as though it had been seen through a glass wedge only whose angle was near 30 degrees.

"This experiment is the very same with that of Sir Isaac Newton above mentioned, notwithstanding the result was so remarkably different: but Mr Dollond assures us, that he used all possible precaution and care in his process; and he kept his apparatus by him, that he might evince the truth of what he wrote, whenever he should be properly required to do it.

"He plainly saw, however, that if the refracting angle of the water-vessel could have admitted of a sufficient increase, the divergency of the coloured rays would have been greatly diminished, or entirely rectified; and that there would have been a very great refraction without colour, as he had already produced a great discolouring without refraction: but the in-

* *Swed. Akad. vol. 16 p. 300.*

19 Colours produced without refraction or reflection.

17 Another theory of colours.

18 One of Sir Isaac Newton's experiments found to be false.

conveniency of so large an angle as that of the prismatic vessel must have been, to bring the light to an equal divergency with that of the glass prism, whose angle was about 60° , made it necessary to try some experiments of the same kind with smaller angles.

"Accordingly he got a wedge of plate-glass, the angle of which was only nine degrees; and, using it in the same circumstances, he increased the angle of the water-wedge, in which it was placed, till the divergency of the light by the water was equal to that by the glass; that is, till the image of the object, though considerably refracted by the excess of the refraction of the water, appeared nevertheless quite free from any colours proceeding from the different refrangibility of the light.

"Notwithstanding it evidently appeared, I may say to almost all philosophers, that Mr Dollond had made a real discovery of something not comprehended in the optical principles of Sir Isaac Newton, it did not appear to be so sensible a man, and so good a mathematician, as Mr Murdoch is universally acknowledged to be. Upon this occasion he interposed in the defence, as he imagined, of Sir Isaac Newton; maintaining, that Mr Dollond's positions, which he says, he knows not by what mishap, have been deemed paradoxes in Sir Isaac's theory of light, are really the necessary consequences of it. He also endeavours to shew, that Sir Isaac might not be mistaken in his account of the experiment above mentioned. But admitting all that he advances in this part of his defence, Newton must have made use of a prism with a much smaller refracting angle than, from his own account of his experiments, we have any reason to believe he ever did make use of.

"The fact probably was, that Sir Isaac deceived himself in this case, by attending to what he imagined to be the clear consequences of his other experiments; and though the light he saw was certainly tinged with colours, and he must have seen it to be so, yet he might imagine that this circumstance arose from some imperfection in his prisms, or in the disposition of them, which he did not think it worth his while to examine. It is also observable, that Sir Isaac is not so particular in his description of his prisms, and other parts of his apparatus, in his account of this experiment, as he generally is in other cases, and therefore probably wrote his account of it from his memory only.

"Much has been said on this experiment; and it is thought very extraordinary that a man of Sir Isaac's accurate attention should overlook a circumstance, the effect of which now appears to be so considerable. But it has happily occurred to Mr Michell, that, as Sir Isaac Newton observes he used to put saccharum saturni into his water to increase its refractive power, the lead, even in this form, might increase the diffusive refraction, as it does in the composition of glass; and if so, that this would account for Newton's not finding the diffusive power of water less than that of his glass prisms, which he otherwise ought to have done, if he had tried the experiment as he said he did.

"Accordingly he included a prism of glass in water,

as highly impregnated with saccharum saturni as it would bear, the proportion of saccharum to water being about as 5 to 11. When the image, seen through the water (so impregnated) and a glass prism, was in its natural place, it still was coloured, though very little: he thought not more than a fourth part as much as when seen through plain water, and the prism in its natural place; so that he had no doubt, but that, if his prism had had a little less of the dispersing power, its errors would have been perfectly corrected."

From all these experiments we can only conclude that the theory of colours seems not yet to be determined with certainty; and very formidable, perhaps unanswerable, objections, might be brought against every hypothesis on this subject that hath been invented. The discoveries of Sir Isaac Newton, however, are sufficient to justify the following

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Theory of
colours still
uncertain.

A P H O R I S M S.

1. All the colours in nature proceed from the rays of light.
2. There are seven primary colours; which are red, orange, yellow, green, blue, indigo, and violet.
3. Every ray of light may be separated into the seven primary colours.
4. The rays of light in passing through the same medium have different degrees of refrangibility.
5. The difference in the colours of light arises from its different refrangibility: that which is the least refrangible producing red; and that which is the most refrangible, violet.
6. By compounding any two of the primary colours, as red and yellow, or yellow and blue, the intermediate colour, as orange or green, may be produced.
7. The colours of bodies arise from their dispositions to reflect one sort of rays, and to absorb the other: those that reflect the least refrangible rays appearing red; and those that reflect the most refrangible, violet.
8. Such bodies as reflect two or more sorts of rays, appear of various colours.
9. The whiteness of bodies arises from their disposition to reflect all the rays of light promiscuously.
10. The blackness of bodies proceeds from their incapacity to reflect any of the rays of light*.

Entertaining EXPERIMENTS, founded on the preceding Principles.

- I. Out of a single colourless ray of light to produce seven other rays, which shall paint, on a white body, the seven primary colours of nature.

PROCEDURE of an optician a large glass prism DEF, Pl. lxxviii. well polished, two of whose sides must contain an angle of about sixty-four degrees. Make a room quite dark, and in the window shutter AB, cut a round hole, about one-third of an inch in diameter at C, through which a ray of light LI passing, falls on the prism DEF: by that it is refracted out of the direction IT, in which it would have proceeded into another GH; and, falling on the paper MNSX, will there form an oblong spectrum PQ, whose ends will be semicircular, and its sides straight; and if the distance of the

Fig. 1.

* From hence it arises that black bodies, when exposed to the sun, become sooner heated than all others.

the prism from the paper be about eighteen feet, it will be ten inches long, and two inches wide. This spectrum will exhibit all the primary colours: the rays between P and V, which are the most refracted, will paint a deep violet; those between V and I, indigo; those between I and B, blue; those between B and G, green; those between G and Y, yellow; those between Y and O, orange; and those between O and R, being the least refracted, an intense red. The colours between these spaces will not be every where equally intense, but will incline to the neighbouring colour: thus the part of the orange next to R, will incline to a red; that next to Y, to a yellow; and so of the rest.

II. *From two or more of the primary colours, to compose others that shall, in appearance, resemble those of the former.*

By mixing the two homogeneous colours red and yellow, an orange will be produced, similar in appearance to that in the series of primary colours; but the light of the one being homogeneous, and that of the other heterogonical, if the former be viewed through a prism it will remain unaltered, but the other will be resolved into its component colours red and yellow. In like manner other contiguous homogeneous colours may compound new colours; as by mixing yellow and green, a colour between them is formed; and if blue be added, there will appear a green that is the middle colour of those three. For the yellow and blue, if they are equal in quantity, will draw the intermediate green equally toward them, and keep it, as it were, in equilibrium, that it verge not more to the one than to the other. To this compound green there may be added some red and violet; and yet the green will not immediately cease, but grow less vivid; till by adding more red and violet it will become more diluted; and at last, by the prevalence of the added colours, it will be overcome, and turned into some anomalous colour.

If the sun's white, composed of all kind of rays, be added to any homogeneous colour, that colour will not vanish, nor change its species, but be diluted; and by adding more white, it will become continually more diluted. Lastly, if red and violet be mixed, there will be generated, according to their various proportions, various purples, such as are not like, in appearance, to the colour of any homogeneous light: and of these purples, mixed with blue and yellow, other new colours may be composed.

III. *Out of three of the primary colours, red, yellow, and blue, to produce all the other prismatic colours, and all that are intermediates to them.*

Fig. 2.

Provide three panes of glass of about five inches square; and divide each of them, by parallel lines; into five equal parts. Take three sheets of very thin paper; which you must paint, lightly, one blue, another yellow, and the third red*. Then paste on

one of the glasses five pieces of the red paper, one of which must cover the whole glass, the second only the four lower divisions, the third the three lower, the fourth the two lowest, and the fifth the last division only. On the other two glasses five pieces of the blue and yellow papers must be pasted in like manner. You must also have a box of about six inches long, and the same depth and width as the glasses: it must be black on the inside: let one end be quite open, and in the opposite end there must be a hole large enough to see the glasses completely. It must also open at the top, that the glasses may be placed in it conveniently.

When you have put any one of these glasses in the box, and the open end is turned toward the sun, you will see five distinct shades of the colour it contains. If you place the blue and yellow glasses together, in a similar direction, you will see five shades of green distinctly formed. When the blue and red glasses are placed, a bright violet will be produced; and by the red and yellow, the several shades of orange.

If, instead of placing these glasses in a similar position, you place the side AB of the yellow glass, against the side BD of the blue, you will see all the various greens that are produced by nature†; if the blue and red glasses be placed in that manner, you will have all the possible varieties of purples, violets, &c.; and lastly, if the red and orange glasses be so placed, there will be all the intermediate colours, as the magenta, aurora, &c.

Fig. 3.

IV. *By means of the three primary colours, red, yellow, and blue, together with light and shade, to produce all the gradations of the prismatic colours.*

On seven square pieces of glass paste papers that are painted with the seven prismatic colours, in the same manner as in the last experiment. The colours for the orange, green, indigo, and violet, may be made by mixing the other three. Then with bistre‡, well diluted, shade a sheet of very thin paper, by laying it light on both its sides. With pieces of this paper cover four-fifths of a glass, of the same size with the others, by laying one piece on the four lowest divisions, another on the three lowest, a third on the two lowest, and the fourth on the lowest division only; and leaving the top division quite uncovered. When one of the coloured glasses is placed in the box, together with the glass of shades, so that the side AB of the one be applied to the side BC of the other, as in fig. 3. the several gradations of colours will appear shaded in the same manner as a drapery judiciously painted with that colour.

It is on this principle that certain French artists have proceeded in their endeavours to imitate, by designs printed in colours, paintings in oil: which they do by four plates of the same size, on each of which is engraved the same design. One of these contains all the shades that are to be represented, and which are painted either black, or with a dark grey. One

* You must use water-colours for this purpose: the blue may be that of Prussia, and very bright; the red, carmine; and the yellow, gamboge, mixed with a little saffron. These colours must be laid very light and even, on both sides of the paper.

† In the first position of the glasses the quantity of blue and yellow being equal, the same sort of green was constantly visible, but by thus inverting the glasses, the quantity of the colours being constantly unequal, a very pleasing variety of tints is produced.

‡ The bistre here used must be made of foot, not that in stone.

One of the three other plates is coloured with blue, another with red, and the third with yellow; each of them being engraved in those parts only which are to represent that colour*, and the engraving is either stronger or weaker, in proportion to the tone of colour that is to be represented†.

These four plates are then passed alternately under the press, and the mixture of their colours produces a print that bears no small resemblance to a painting. It must be confessed, however, that what has been hitherto done of this kind falls far short of that degree of perfection of which this art appears susceptible. If they who engrave the best in the manner of the crayon were to apply themselves to this art, there is reason to expect they would produce far more finished pieces than we have hitherto seen.

V. *To make figures appear of different colours successively.*

Fig. 4.

MAKE a hole in the window-shutter of a dark room, through which a broad beam of light may pass, that is to be refracted by the large glass prism ABC, which may be made of pieces of mirrors cemented together, and filled with water. Provide another prism DEF, made of three pieces of wood; through the middle of this there must pass an axis on which it is to revolve. This prism must be covered with white paper; and each of its sides cut through in several places, so as to represent different figures, and those of each side should likewise be different. The inside of this prism is to be hollow, and made quite black, that it may not reflect any of the light that passes through the sides into it. When this prism is placed near to that of glass, as in the figure, with one of its sides EF perpendicular to the ray of light, the figures on that side will appear perfectly white: but when it comes into the position *g h*, the figures will appear yellow and red; and when it is in the position *k l*, they will appear blue and violet. As the prism is turned round its axis, the other sides will have a similar appearance. If instead of a prism a four or five sided figure be here used, the appearances will be still further diversified.

This phenomenon arises from the different refrangibility of the rays of light. For when the side EF is in the position *g h*, it is more strongly illuminated by the least refrangible rays; and wherever they are predominant, the object will appear red or yellow. But when it is on the position *k l*, the more refrangible rays being then predominant, it will appear tinged with blue and violet.

VI. *The solar magic lantern.*

PROCURE a box, of about a foot high, and 18 inches wide, or such other similar dimensions as you shall think fit; and about three inches deep. Two of

the opposite sides of this box must be quite open; and in each of the other sides let there be a groove, wide enough to pass a stiff paper or pasteboard. This box must be fastened against a window on which the sun's rays fall direct. The rest of the window should be closed up, that no light may enter. Provide several sheets of stiff paper, which must be blacked on one side. On these papers cut out such figures as you shall think proper; and placing them alternately in the grooves of the box, with their blacked sides towards you, look at them through a large and clear glass prism; and if the light be strong, they will appear to be painted with the most lively colours in nature. If you cut on one of these papers the form of the rainbow, about three quarters of an inch wide, you will have a lively representation of that in the atmosphere.

This experiment may be further diversified, by passing very thin papers, lightly painted with different colours, over some of the parts that are cut out: which will appear to change their colours, when viewed through the prism, and to stand out from the paper, at different distances, according to the different degrees of refrangibility of the colours with which they are painted. For greater convenience, the prism may be placed in a stand on a table, at the height of your eye, and made to turn round on an axis, that when you have got an agreeable prospect, you may fix in that position.

VII. *The prismatic camera obscura.*

MAKE two holes F, *f*, in the shutter of a dark chamber, near to each other; and against each hole place a prism ABC, and *a b c*, in a perpendicular direction, that their spectrums NM may be cast on the paper in a horizontal line, and coincide with each other; the red and violet of the one being in the same part with those of the other. The paper should be placed at such a distance from the prisms that the spectrum may be sufficiently dilated. Provide several papers nearly of the same dimensions with the spectrum, cross these papers, and draw lines parallel to the divisions of the colours. In these divisions cut out such figures as you shall find will have an agreeable effect, as flowers, trees, animals, &c. When you have placed one of these papers in its proper position, hang a black cloth or paper behind it, that none of the rays that pass through may be reflected and confuse the phenomenon. The figures cut on the paper will then appear strongly illuminated with all the original colours of nature. If while one of the prisms remains at rest, the other be revolved on its axis, the continual alteration of the colours will afford a pleasing variety; which may be further increased by turning the prism round in different directions.

When the prisms are so placed that the two spectrums become coincident in an inverted order of their colours,

Fig. 5.

* When a red drapery is required, it is engraved on the plate assigned to that colour; and so of yellow and blue: but if one of the other colours be wanting, suppose violet, it must be engraved on those that print the red and blue: and so of the rest. The plates of this kind have been hitherto engraved in the manner of mezzotint; but these, unless they are skillfully managed, soon become smutty. Engravings in the manner of the crayon, will perhaps answer better.

† The principal difficulty in this sort of engraving arises from want of a skillful management, in giving each plate that precise degree of engraving which will produce the tone of colour required. If a bright green is to be represented, there should be an equal quantity of graving on the red and yellow plates: but if an olive green, the yellow plate should be engraved much deeper than the red.

colours, the red end of one falling on the violet end of the other; if they be then viewed through a third prism *DH*, held parallel to their length, they will no longer appear coincident, but in the form of two distinct spectrums, *p t*, and *n m*, (fig. 6.) crossing one another in the middle, like the letter *X*: the red of one spectrum and the violet of the other, which were coincident at *NM*, being parted from each other by a greater refraction of the violet to *p*, and *m*, than that of the red to *n* and *t*.

This experiment may be further diversified by adding two other prisms, that shall form a spectrum in the same line, and contiguous to the other; by which not only the variety of figures, but the vicissitude of colours, will be considerably augmented.

VIII. The diatonic scale of colours.

THE illustrious Newton, in the course of his investigations of the properties of light, discovered that the length of the spaces which the seven primary colours possess in the spectrum, exactly corresponds to those of chords that sound the seven notes in the diatonic scale of music. As is evident by the following experiment.

Fig. 7.

On a paper in a dark chamber, let a ray of light be largely refracted into the spectrum *AFTMGF*, and mark the precise boundaries of the several colours, as *a, b, c, &c.* Draw lines from those points perpendicular to the opposite side, and you will find that the spaces *M r f f'*, by which the red is bounded; *r g e f*, by which the orange is bounded; *g p e d*, by which the yellow is bounded, &c. will be in exact proportion to the divisions of a musical chord for the notes of an octave; that is, as the intervals of these numbers $1, \frac{9}{8}, \frac{5}{4}, \frac{4}{3}, \frac{3}{2}, \frac{2}{1}$.

IX. Colorific music.

FATHER CASTEL, a Frenchman, in a curious book he has published on chromatics, supposes the note *ut* to answer to blue in the prismatic colours; the note *re* to yellow, and *mi* to red. The other tones he refers to the intermediate colours, from whence he constructs the following gamut of colorific music:

Ut	Blue
Ut sharp	Sea-green
Re	Bright green
Re sharp	Olive green
Mi	Yellow
Fa	Aurora
Fa sharp	Orange
Sol	Red
Sol sharp	Crimson
La	Violet
La sharp	Blue violet
Si	Sky blue
Ut	Blue

This gamut, according to his plan, is to be continued in the same manner for the following octave; except that the colours are to be more vivid.

He supposes that these colours, by striking the eye in the same succession as the sounds (to which he makes them analogous) do the ear, and in the same order of time, they will produce a correspondent sensation of

pleasure in the mind. It is on these general principles, which F. Castel has dilucidated in his treatise, that he has endeavoured, though with little success, to establish his ocular harpsichord.

The construction of this instrument, as here explained, will show that the effects produced by colours by no means answer those of sounds, and that the principal relation there is between them consists in the duration of the time that they respectively affect the senses.

Between two circles of pasteboard, of ten inches diameter, *AB* and *CD*, inclose a hollow pasteboard cylinder *E*, 18 inches long. Divide this cylinder into spaces half an inch wide, by a spiral line that runs round it from top to bottom, and divide its surface into six equal parts by parallel lines drawn between its two extremities; as is expressed in the figure.

Fig. 8.

Let the circle *AB*, at top, be open; and let that at bottom, *CD*, be closed, and supported by an axis or screw, of half an inch diameter, which must turn freely in a nut placed at the bottom of a box we shall presently describe. To the axis just mentioned adjust a wooden wheel *G*, of two inches and a half in diameter, and that has 12 or 15 teeth, which take the endless screw *H*. Let this cylinder be inclosed in a box *ILMN* (fig. 9.) whose base is square, and at whose bottom there is a nut in which the axis *F* turns. Observe that the endless screw *H*, should come out of the box, that it may receive the handle *O*, by which the cylinder is to be turned.

This box being closed all round, place over it a tin covering *A*, which must be perforated in different parts; from this cover there must hang three or four lights, so placed that they may strongly illumine the inside of the cylinder. In one side of this box (which should be covered with pasteboard) cut eight apertures, *a, b, c, d, e, f, g, h*, of half an inch wide, and $\frac{1}{2}$ of an inch high; they must be directly over each other, and the distance between them must be exactly two inches. It is by these openings, which here correspond to the musical notes, that the various colours analogous to them are to appear; and which being placed on the pasteboard cylinder, as we have shown, are reflected by means of the lights placed within it.

Fig. 9.

It is easy to conceive, that when the handle *O* is turned, the cylinder in consequence rising half an inch, if it be turned five times round, it will successively show, at the openings made in the side of the box, all those that are in the cylinder itself, and which are ranged according to the direction of the inclined lines drawn on it. It is therefore according to the duration of the notes which are to be expressed, that the apertures on the cylinder are to be cut. Observe, that the space between two of the parallel lines drawn vertically on the cylinder, is equal to one measure of time; therefore, for every turn of the cylinder, there are six measures, and thirty measures for the air that is to be played by this instrument.

The several apertures being made in the side of the cylinder, in conformity to the notes of the tune that is to be expressed, they are to be covered with double pieces of very thin paper, painted on both sides with the colours that are to represent the musical notes.

This.

This experiment might be executed in a different manner, and with a much greater extent; but as the entertainment would not equal the trouble and ex-

pence, we have thought it sufficient to give the above piece, by which the reader will be enabled to judge how far the analogy supposed by F. Castet really exists.

CHRONIC, or CHRONICAL, among physicians, an appellation given to diseases that continue a long time; in contradistinction to those that soon terminate, and are called *acute*.

CHRONICLE, in matters of literature, a species or kind of history disposed according to the order of time, and agreeing in most respects with annals. See ANNALS.

Books of CHRONICLES, a canonical writing of the Old Testament. It is uncertain which were written first, *The Books of Kings*, or *The Chronicles*, since they each refer to the other. However it be, the latter is often more full and comprehensive than the former. Whence the Greek interpreters call these two books *Παραπομπαι*, *Supplements*, *Additions*, because they contain some circumstances which are omitted in the other historical books. The Jews make but one book of the Chronicles, under the title of *Dibre-Haiaimim*, i. e. *Journals* or *Annals*. Ezra is generally believed to be the author of these books. It is certain they were written after the end of the Babylonish capti-

vity, and the first year of the reign of Cyrus, of whom mention is made in the last chapter of the second book.

The *Chronicles*, or *Paraleipomena*, are an abridgement of all the sacred history, from the beginning of the Jewish nation to their first return from the captivity, taken out of those books of the Bible which we still have, and out of other annals which the author had then by him. The design of the writer was to give the Jews a series of their history. The first book relates the rise and propagation of the people of Israel from Adam, and gives a punctual and exact account of the reign of David. The second book sets down the progress and end of the kingdom of Judah, to the very year of their return from the Babylonish captivity.

CHRONOGRAM, a species of false wit, consisting in this, that a certain date or epocha is expressed by numeral letters of one or more verses; such is that which makes the motto of a medal struck by Gustavus Adolphus in 1632:

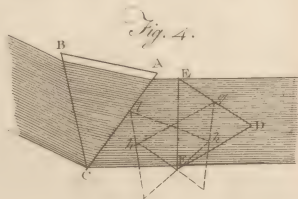
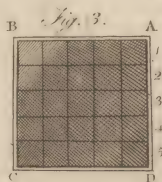
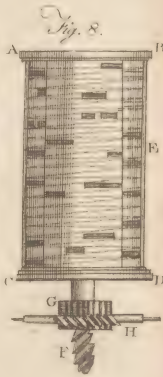
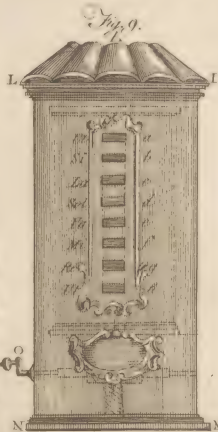
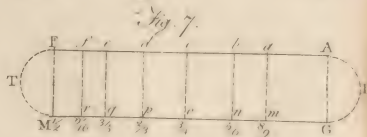
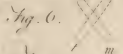
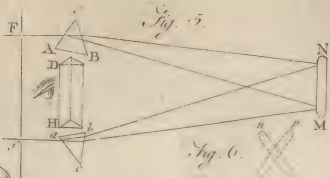
ChrIRV DVX; ergo trIVMphVs.

C H R O N O L O G Y

IS the science that teaches the method of measuring time and distinguishing its parts. It is more difficult, than may at first appear, to determine the precise idea, and clearly to explain the nature, of time. That ingenious and subtle impostor Mahomet has given in his Alcoran some traces of very refined ideas of this subject. But, leaving these metaphysical researches, we shall content ourselves with saying, that by *time* we here mean the duration and succession of created beings. To determine a fixed and sensible measure of duration, it is necessary to find some motion that is constantly uniform, which may serve as a scale for that measure. From the creation of the world, it has been observed that the courses of the heavenly bodies afford the most universal measure of motion to all the inhabitants of the earth. As it was originally imagined that the sun turned round the earth, his annual and diurnal revolutions were fixed on for the common measure of time; and by this measure they divided the duration of beings into years, months, weeks, days, hours, minutes, and seconds. It may seem strange to an astronomer, or chronologist, to read, in the first chapter of Genesis, that God did not create the sun, moon, and stars, till the fourth day, and that there were days and nights before there was any sun. But who can say what is there precisely meant by the word *day*? Moses, who lived about 3000 years after the creation, wrote the origin and history of the Jews. In order to which, he recurred to the origin of all things: he began with the creation itself: but he wrote to men; and to men who were even less enlightened than we are, especially in matters of astronomy. He was,

therefore, obliged to make use of expressions that were to them intelligible. The scriptures were moreover given to mankind to serve them as guides in matters of religion, and not to teach them astronomy; of which were they ignorant, they would be obliged to believe, for example, that the sun moves round the earth, and that it was stopped, though a thousand times greater than the whole terrestrial globe, by the desire of Joshua at Gibeon; and that the moon halted in the valley of Ajalon, &c.: all which is directly contrary to the eternal laws of nature, and therefore, taken in the strict letter, cannot be true. But who knows what means Providence may have employed to produce these appearances? Without making further inquiry into these matters, let us acknowledge the goodness of the Holy Spirit that has vouchsafed to speak to mankind in a language adapted to their capacities, in pointing out the path that leads to eternal felicity; where those dark clouds which now surround the human understanding shall be dispersed, and it will then perhaps discover many of those positions to be errors which philosophers and astronomers now regard as axioms or incontestable truths.

The term *chronology*, when taken in its full extent, has two objects: the first is the measuring of time and its different divisions. This part of chronology is regulated by astronomical calculation, and consequently makes a part of mathematics; and it is by this method that we are enabled to make complete calendars or almanacs. The second part of chronology consists in fixing the dates of all those events that are related in history, and of ranging them in the several divisions of time in which they occurred: and by this means





means chronology becomes one of the essential parts of history. This second part draws its principles from the first; but it has need of other supports, as of criticism, of the testimony of authors, of ancient coins, medals, inscriptions, &c. of such epochs in history as are incontestable; of eclipses of the sun and moon, and other astronomical observations, &c. The subject of the *first* part has been treated under *ASTRONOMY*. That of the *second* falls to be considered in the present article.

OF HISTORIC CHRONOLOGY.

It is in this science that Julius Africanus, Eusebius of Casarea, George Cynelle, John of Antioch, Denis, Petau, Cluvier, Calvisius, Uher, Simfon, John Marsham, and many other learned men, have excelled. It consists of four principal parts, that form the foundations on which all its learned researches rest. These are,

1. Astronomic observations, and particularly on the eclipses of the sun and moon, combined with the calculations of mathematic chronology on the different eras and years of different nations.
2. The testimonies of credible authors.
3. Those epochs in history which are so determined and evident that no one has ever contested them.
4. Ancient medals, coins, monuments, and inscriptions.

We shall examine these four principal parts in the order they here stand; and conclude with some reflections on the uncertainty that still reigns, notwithstanding these lights, in chronological history.

I.

It is with great reason that the eclipses of the sun, and moon, and the aspects of the other planets, have been called public and celestial characters of the times, as their calculations afford chronologers infallible proofs of the precise epochs in which a great number of the most signal events in history have occurred. So that in chronological matters we cannot make any great progress, if we are ignorant of the use of astronomic tables, and the calculation of eclipses. The ancients regarded the latter as prognostics of the fall of empires, of the loss of battles, of the death of monarchs, &c. And it is to this superstition, to this wretched ignorance, that we happily owe the vast labour that historians have taken to record so great a number of them. The most able chronologers have collected them with still greater labour. Calvisius, for example, finds his chronology on 144 eclipses of the sun, and 127 of the moon, that he says he had calculated. The grand conjunction of the two superior planets, Saturn and Jupiter, which, according to Kepler, occurs once in 800 years in the same point of the zodiac, and which has happened only eight times since the creation, (the last time in the month of December 1603), may also furnish chronology with incontestable proofs. The same may be said of the transit of Venus over the sun, which has been observed in our days, and all the other uncommon positions of the planets. But among these celestial and natural characters of times, there are also some that are named *civil* or *artificial*, and which, nevertheless, depend on astronomic calculation.

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Such are the solar and lunar cycles; the Roman indiction; the feast of Easter; the bissextile year; the jubilees; the sabbatic years; the combats and Olympic games of the Greeks; and heira of the Mahometans, &c. And to these may be added the periods, eras, epochs, and years of different nations, ancient and modern. We shall only remark on this occasion, that the period or era of the Jews commences with the creation of the world; that of the ancient Romans with the foundation of the city of Rome; that of the Greeks at the establishment of the Olympic games; that of Nebuchadnezzar, with the advancement of the first king of Babylon to the throne; the Yezdegerdic years, with the last king of the Persians of that name; the heira of the Turks with the flight of Mahomet from Mecca to Medina, &c. The year of the birth of Christ was the 4713th year of the Julian period, according to the common method of reckoning. Astronomical chronology teaches us to calculate the precise year of the Julian period in which each of these epochs happened. See *ASTRONOMY*, Sect. xii.

II.

THE testimony of authors is the second principal part of historic chronology. Though no man whatever has a right to pretend to infallibility, or to be regarded as a sacred oracle, it would, however, be making a very unjust judgment of mankind, to treat them all as dupes or impostors; and it would be an injury offered to public integrity, were we to doubt the veracity of authors universally esteemed, and of facts that are in themselves right worthy of belief. It would be even a kind of infatuation to doubt that there have been such cities as Athens, Sparta, Rome, Carthage, &c. or that Xerxes reigned in Persia, and Augustus in Rome; whether Hannibal ever was in Italy; or that the emperor Constantine built Constantinople, &c. The unanimous testimony of the most respectable historians will not admit any doubt of these matters. When an historian is allowed to be completely able to judge of an event, and to have no intent of deceiving by his relation, his testimony is irrefutable. But to avoid the danger of adopting error for truth, and to be satisfied of a fact that appears doubtful in history, we may make use of the four following rules, as they are founded in reason.

1. We ought to pay a particular regard to the testimonies of those who wrote at the same time the events happened, and that have not been contradicted by any cotemporary author of known authority. Who can doubt, for example, of the truth of the facts related by admiral Anfon, in the history of his voyage round the world? The admiral saw all the facts there mentioned with his own eyes, and published his book when two hundred companions of his voyage were still living in London, and could have contradicted him immediately, if he had given any false or exaggerated relations.

2. After the cotemporary authors, we should give more credit to those who lived near the time the events happened, than those who lived at a distance.

3. Those doubtful histories, which are related by authors that are but little known, can have no weight

if they are at variance with reason, or established tradition.

4. We must distrust the truth of a history that is related by modern authors, when they do not agree among themselves in several circumstances, nor with ancient historians, who are to be regarded as original sources. We should especially doubt the truth of those brilliant portraits, that are drawn at pleasure by such as never knew the persons they are intended for, and even made several centuries after their decease.

The most pure and most fruitful source of ancient history is doubtless to be found in the Holy Bible. Let us here for a moment cease to regard it as divine, and let us presume to consider it as a common history. Now, when we regard the writers of the books of the Old Testament, and consider them sometimes as authors, sometimes as ocular witnesses, and sometimes as respectable historians; whether we reflect on the simplicity of the narration, and the air of truth that is there constantly visible; or, when we consider the care that the people, the governments, and the learned men of all ages have taken to preserve the true text of the Bible; or that we have regard to the happy conformity of the chronology of the Holy Scriptures with that of prophane history; or, if we observe the admirable harmony that is between these books and the most respectable historians, as Josephus and others; and lastly, when we consider that the books of the holy scripture furnish us alone with an accurate history of the world from the creation, through the line of patriarchs, judges, kings and princes of the Hebrews; and that we may, by its aid, form an almost entire series of events down to the birth of Christ, or the time of Augustus, which comprehends a space of about 4000 years, some small interruptions excepted, and which are easily supplied by profane history: when all these reflections are justly made, we must constantly allow that the scriptures form a book which merits the first rank among all the sources of ancient history. It has been objected, that this book contains contradictions; but the most able interpreters have reconciled these seeming contradictions. It has been said, that the chronology of the Hebrew text and the Vulgate, do not agree with the chronology of the version of the Septuagint; but the soundest critics have shown that they may be made to agree. It has been observed, moreover, that the scriptures abound with miracles and prodigies; but they are miracles that have really happened: and what ancient history is there that is not filled with miracles and other marvellous events? And do we for that reject their authority? Cannot the true God be supposed to have performed those miracles which Pagan historians have attributed to their false divinities? Must we pay no regard to the writings of Livy, because his history contains many fabulous relations?

III.

THE *epochs* form the third principal part of chronology. These are those fixed points in history that have never been contested, and of which there can, in fact, be no doubt. Chronologers fix on the events that are to serve as epochs, in a manner quite arbitrary;

but this is of little consequence, provided the dates of these epochs agree, and that there is no contradiction in the facts themselves. When we come to treat expressly on history, we shall mention, in our progress, all the principal epochs.

IV.

MEDALS, monuments, and inscriptions, form the fourth and last principal part of chronology. It is scarce more than 150 years since close application has been made to the study of these; and we owe to the celebrated Spanheim the greatest obligations, for the progress that is made in this method; his excellent work, *De præstantia et usu numismatum antiquorum*, has shown the great advantages of it; and it is evident that these monuments are the most authentic witnesses that can be produced. It is by the aid of medals that M. Vaillant has composed his judicious history of the kings of Syria, from the time of Alexander the Great to that of Pompey: they have been, moreover, of the greatest service in elucidating all ancient history, especially that of the Romans; and even sometimes that of the middle age. Their use is more fully spoken of in the article MEDALS. What we here say of medals, is to be understood equally, in its full force, of ancient inscriptions, and of all other authentic monuments that have come down to us: as the famous *Arun del marbles*, which the earl of Arundel (from whom they have been denominated) purchased from the Turks in the Levant, by William Petre, whom he sent thither for that purpose. These marbles, which were ranged at London in the rooms and garden of that nobleman, on the border of the Thames, were found in the island of Paros; and contain a chronicle, wherein the principal epochs of the history of the Athenians are exactly and distinctly marked, from the first year of the reign of Cecrops, which began 1582 years before the Christian era. John Selden composed a book in 1629, the title of which is *Marmora Arundelliana*, wherein he explains these valuable antiquities.

Every reader, endowed with a just discernment, will readily allow that these four parts of chronology afford clear lights, and are excellent guides to conduct us through the thick darkness of antiquity. That impartiality, however, which directs us to give a faithful relation of that which is true and false, of the certainty and uncertainty of all the sciences, obliges us here freely to confess, that these guides are not infallible, nor the proofs that they afford mathematical demonstrations. In fact, with regard to history in general, and ancient history in particular, something must be always left to conjecture and historic faith. It would be an offence against common probity, were we to suffer ourselves to pass over in silence those objections which authors of the greatest reputation have made against the certainty of chronology. We shall extract them from their own works; and we hope that there is no magistrate, theologian, or public professor in Europe, who would be mean enough to accuse us of a crime, for not unworthily disguising the truth.

1. The prodigious difference there is between the Septuagint Bible and the Vulgate, in point of chronology,

Bisfield's
Elements.

logy, occasions an embarrassment, which is the more difficult to avoid, as we cannot positively say on which side the error lies. The Greek Bible counts, for example, from the creation of the world to the birth of Abraham, 1500 years more than the Hebrew and Latin Bibles, &c. 2. How difficult is it to ascertain the years of the judges of the Jewish nation, in the Bible? What darkness is spread over the succession of the kings of Judah and Israel? The calculation of time is there so inaccurate, that the scripture never marks if they are current or complete years. For we cannot suppose that a patriarch, judge, or king, lived exactly 60, 90, 100, or 999 years, without any odd months or days. 3. The different names that the Assyrians, Egyptians, Persians, and Greeks, have given to the same prince, have contributed not a little to embarrass all ancient chronology. Three or four princes have borne the name of Assuerus, though they had also other names. If we did not know that Nabucodonosor, Nabucodrosor, and Nabucolassar, were the same name, or the name of the same man, we should scarcely believe it. Sargon is Sennacherib; Ozias is Azarias; Sedecias is Marhanias; Joachas is also called Sellum; Adaraddon, which is pronounced indifferently Esarhaddon and Afarhaddon, is called Asenaphar by the Cuthians; and by an oddity of which we do not know the origin, Sardanapalus is called by the Greeks Tenos Concoleros. 4. There remain to us but few monuments of the first monarchs of the world. Numberless books have been lost, and those which have come down to us are mutilated or altered by transcribers. The Greeks began to write very late. Herodotus, their first historian, was of a credulous disposition, and believed all the fables that were related by the Egyptian priests. The Greeks were in general vain, partial, and held no nation in esteem but their own. The Romans were still more infatuated with notions of their own merit and grandeur: their historians were altogether as unjust as was their senate, toward other nations that were frequently far more respectable. 5. The eras, the years, the periods and epochs, were not the same in each nation; and they, moreover, began at different seasons of the year. All this has thrown so much obscurity over chronology, that it appears to be beyond all human capacity totally to disperse it.

Christianity itself had subsisted near 1200 years, before they knew precisely how many years had passed since the birth of our Saviour. They saw clearly that the vulgar era was defective, but it was a long time before they could comprehend that it required four whole years to make up the true period. Abbé Denis the Little, who, in the year 532, was the first among the Christians, to form the era of that grand epoch, and to count the years from that time, in order to make their chronology altogether Christian, erred in his calculation, and led all Europe into his error. They count 132 contrary opinions of different authors concerning the year in which the Messiah appeared on the earth. M. Vallemont names 64 of them, and all celebrated writers. Among all these authors, however, there is none that reckon more than 7000, nor less than 3700 years. But even this difference is enormous. The most moderate fix the

birth of Christ in the 4000th year of the world. The reasons, however, on which they found their opinion, appear to be sufficiently arbitrary.

Be these matters, however, as they may, the wisdom of Providence has so disposed all things, that there remain sufficient lights to enable us nearly to connect the series of events: for in the first 3000 years of the world, where profane history is defective, we have the chronology of the Bible to direct us; and after that period, where we find more obscurity in the chronology of the holy scriptures, we have, on the other hand, greater lights from profane authors. It is at this period that begin the time which Varro calls *historicæ*: as, since the time of the Olympiads, the truth of such events as have happened shines clear in history. Chronology, therefore, draws its principal lights from history; and, in return, serves it as a guide. Referring the reader, therefore, to the article HISTORY, and the *Chart* thereto annexed, we shall conclude the present article with

A CHRONOLOGICAL TABLE of Remarkable Events, Discoveries, and Inventions, from the Creation to the present Time.

BEF. CHRIST.

4004 THE creation of the world, and Adam and Eve.
4003 The birth of Cain, the first who was born of a woman.

3017 Enoch, for his piety, is translated to Heaven.

2348 The old world is destroyed by a deluge which continued 377 days.

2247 The Tower of Babel is built about this time by Noah's posterity, upon which God miraculously confounds their language, and thus disperses them into different nations.

About the same time, Noah is, with great probability, supposed to have parted from his rebellious offspring, and to have led a colony of some of the more tractable into the east, and there either he or one of his successors to have founded the ancient Chinese monarchy.

2234 The celestial observations are begun at Babylon, the city which first gave birth to learning and the sciences.

2188 Misraim, the son of Ham, founds the kingdom of Egypt, which lasted 1663 years, down to the conquest of Cambyfes, in 525 before Christ.

2059 Ninus, the son of Belus, founds the kingdom of Assyria, which lasted above 1000 years, and out of its ruins were formed the Assyrians of Babylon, those of Nineveh, and the kingdom of the Medes.

1921 The covenant of God made with Abram, when he leaves Haran to go into Canaan, which begins the 430 years of sojourning.

1897 The cities of Sodom and Gomora are destroyed for their wickedness, by fire from heaven.

1856 The kingdom of Argos, in Greece, begins under Inachus.

1822 Memnon, the Egyptian, invents the letters.

1715 Prometheus first struck fire from flints.

1635 Joseph dies in Egypt, which concludes the book of Genesis, containing a period of 2369 years.

Bef. Christ.

- 1574 Aaron born in Egypt; 1490, appointed by God first high-priest of the Israelites.
- 1571 Moses, brother to Aaron, born in Egypt, and adopted by Pharaoh's daughter, who educates him in all the learning of the Egyptians.
- 1556 Cecrops, brings a colony of Saïtes from Egypt into Attica, and begins the kingdom of Athens in Greece.
- 1546 Scamander comes from Crete into Phrygia, and begins the kingdom of Troy.
- 1493 Cadmus carried the Phenician letters into Greece, and built the citadel of Thebes.
- 1491 Moses performs a number of miracles in Egypt, and departs from that kingdom, together with 600,000 Israelites, besides children, which completed the 430 years of sojourning. They miraculously pass through the Red Sea, and come to the desert of Sinai, where Moses receives from God, and delivers to the people, the Ten Commandments, and the other laws, and sets up the tabernacle, and in it the ark of the covenant.
- 1485 The first ship that appeared in Greece, was brought from Egypt by Danaus, who arrived at Rhodes, and brought with him his fifty daughters.
- 1453 The first Olympic games celebrated at Olympia in Greece.
- 1452 The Pentateuch, or five first books of Moses, are written in the land of Moab, where he died the year following, aged 110.
- 1451 The Israelites, after sojourning in the Wilderness forty years, and led under Joshua into the land of Canaan, where they fix themselves, after having subdued the natives; and the period of the sabbatical year commences.
- 1406 Iron is found in Greece, from the accidental burning of the woods.
- 1198 The rape of Helen by Paris, which, in 1193, gave rise to the Trojan war, and siege of Troy, by the Greeks, which continued ten years, when that city was taken and burnt.
- 1048 David is sole king of Israel.
- 1004 The Temple is solemnly dedicated by Solomon.
- 896 Elijah, the prophet, is translated to Heaven.
- 894 Money first made of gold and silver at Argos.
- 869 The city of Carthage, in Africa, founded by queen Dido.
- 814 The kingdom of Macedon begins.
- 753 Æra of the building of Rome in Italy by Romulus, first king of the Romans.
- 720 Samaria taken, after three years siege, and the kingdom of Israel finished, by Salmanassar, king of Assyria, who carries the ten tribes into captivity.
- The first eclipse of the moon on record.
- 658 Byzantium (now Constantinople) built by a colony of Athenians.
- 604 By order of Necho, king of Egypt, some Phenicians sailed from the Red Sea round Africa, and returned by the Mediterranean.
- 600 Thales, of Miletus, travels into Egypt, consults the priests of Memphis, acquires the knowledge of geometry, astronomy, and philoso-

phy; returns to Greece, calculates eclipses, gives general notions of the universe, and maintains that an only supreme Intelligence regulates all its motions.

Bef. Christ.

- Maps, globes, and the signs of the Zodiac, invented by Anaximander, the scholar of Thales.
- 597 Jehoiakin, king of Judah, is carried away captive, by Nebuchadnezzar, to Babylon.
- 587 The city of Jerusalem taken, after a siege of 18 months.
- 562 The first comedy at Athens acted upon a moveable scaffold.
- 559 Cyrus the first king of Persia.
- 538 The kingdom of Babylon finished; that city being taken by Cyrus, who, in 536, gives an edict for the return of the Jews.
- 535 The first tragedy was acted at Athens, on a waggon, by Thespis.
- 526 Learning is greatly encouraged at Athens, and a public library first founded.
- 515 The second temple at Jerusalem is finished under Darius.
- 509 Tarquin, the seventh and last king of the Romans, is expelled, and Rome is governed by two consuls, and other republican magistrates, till the battle of Pharsalia, being a space of 461 years.
- 504 Sardis taken and burnt by the Athenians, which gave occasion to the Persian invasion of Greece.
- 486 Æschylus, the Greek poet, first gains the prize of tragedy.
- 481 Xerxes the Great, king of Persia, begins his expedition against Greece.
- 458 Ezra is sent from Babylon to Jerusalem, with the captive Jews and the vessels of gold and silver, &c. being seventy weeks of years, or 490 years before the crucifixion of our Saviour.
- 454 The Romans send to Athens for Solon's laws.
- 451 The Decemvirs created at Rome, and the laws of the twelve tables compiled and ratified.
- 430 The history of the Old Testament finishes about this time.
- Malachi the last of the prophets.
- 400 Socrates, the founder of moral philosophy among the Greeks, believes the immortality of the soul, a state of rewards and punishments; for which, and other sublime doctrines, he is put to death by the Athenians, who soon after repent, and erect to his memory a statue of brass.
- 331 Alexander the Great, king of Macedon, conquers Darius, king of Persia, and other nations of Asia. 323, Dies at Babylon, and his empire is divided by his generals into four kingdoms.
- 285 Dionysius, of Alexandria, began his astronomical æra on Monday June 26, being the first who found the exact solar year to consist of 365 days, 5 hours, and 49 minutes.
- 284 Ptolemy Philadelphus, king of Egypt, employs 72 interpreters to translate the Old Testament into the Greek language, which is called the Septuagint.
- 269 The first coining of silver at Rome.
- 264 The first Punic war begins, and continues 23 years.

years. The chronology of the Arundelian marbles composed.

- 260 The Romans first concern themselves in naval affairs, and defeat the Carthaginians at sea.
- 237 Hamilcar, the Carthaginian, causes his son Hannibal, at nine years old, to swear eternal enmity to the Romans.
- 218 The second Punic war begins, and continues 17 years. Hannibal passes the Alps, and defeats the Romans in several battles; but being amused by his women, does not improve his victories by the storming of Rome.
- 190 The first Roman army enters Asia, and from the spoils of Antiochus brings the Asiatic luxury first to Rome.
- 168 Perseus defeated by the Romans, which ends the Macedonian kingdom.
- 167 The first library erected at Rome, of books brought from Macedonia.
- 163 The government of Judea under the Maccabees begins, and continues 126 years.
- 146 Carthage, the rival to Rome, is razed to the ground by the Romans.
- 135 The history of the Apocrypha ends.
- 52 Julius Cæsar makes his first expedition into Britain.
- 47 The battle of Pharfalia, between Cæsar and Pompey, in which the latter is defeated. The Alexandrian library, consisting of 400,000 valuable books, burnt by accident.
- 45 The war of Africa, in which Cato kills himself. The solar year introduced by Cæsar.
- 44 Cæsar, the greatest of the Roman conquerors, after having fought fifty pitched battles, and slain 1,192,000 men, is killed in the senate-house by conspirators.
- 31 The battle of Actium fought, in which Mark Anthony and Cleopatra are totally defeated by Octavius, nephew to Julius Cæsar.
- 30 Alexandria, in Egypt, is taken by Octavius, upon which Anthony and Cleopatra put themselves to death, and Egypt is reduced to a Roman province.
- 27 Octavius, by a decree of the senate, obtains the title of Augustus Cæsar, and an absolute exemption from the laws, and is properly the first Roman emperor.
- 8 Rome at this time is fifty miles in circumference, and contains 463,000 men fit to bear arms.
The temple of Janus is shut by Augustus, as an emblem of universal peace, and
JESUS CHRIST is born, on Monday, December 25.
- 12 — Disputes with the Doctors in the Temple;
- 27 — is baptized in the wilderness by John,
- 33 — and crucified on Friday, April 3. at 3 o'clock P. M. his resurrection on Sunday, April 5; his Ascension, Thursday May 14.
- 26 St Paul converted.
- 39 St Matthew writes his Gospel.
Pontius Pilate kills himself.
- 40 The name of Christians first given at Antioch to the followers of Christ.

- 43 Claudius Cæsar's expedition into Britain.
- 44 St Mark writes his Gospel.
- 49 London is founded by the Romans; 368, surrounded by ditto with a wall, some parts of which are still observable.
- 51 Caractacus, the British king, is carried in chains to Rome.
- 52 The council of the Apostles at Jerusalem.
- 55 St Luke writes his gospel.
- 59 The emperor Nero puts his mother and brothers to death.
— Persecutes the Druids in Britain.
- 61 Boadicea, the British queen, defeats the Romans; but is conquered soon after by Suetonius, governor of Britain.
- 62 St Paul is sent in bonds to Rome—writes his epistles between 51 and 66.
- 63 The Acts of the Apostles written.
Christianity is supposed to be introduced into Britain by St Paul or some of his disciples about this time.
- 64 Rome set on fire, and burned for six days; upon which began (under Nero) the first persecution against the Christians.
- 67 St Peter and St Paul put to death.
- 70 While the factious Jews are destroying one another with mutual fury, Titus, the Roman general, takes Jerusalem, which is razed to the ground, and the plough made to pass over it.
- 83 The philosophers expelled Rome by Domitian.
- 85 Julius Agricola, governor of South-Britain, to protect the civilized Britains from the incursions of the Caledonians, builds a line of forts between the rivers Forth and Clyde; defeats the Caledonians under Calgacus on the Grampian hills; and first sails round Britain, which he discovers to be an island.
- 96 St John the evangelist wrote his Revelation—his Gospel in 97.
- 121 The Caledonians reconquer from the Romans all the southern parts of Scotland; upon which the emperor Adrian builds a wall between Newcastle and Carlisle; but this also proving ineffectual, Pollius Urbicus, the Roman general, about the year 144, repairs Agricola's forts which he joins by a wall four yards thick.
- 135 The second Jewish war ends, when they were all banished Judea.
- 139 Justin writes his first Apology for the Christians.
- 141 A number of heresies appear about this time.
- 152 The emperor Antoninus Pius stops the persecution against the Christians.
- 217 The Septuagint found in a cask.
- 222 About this time the Roman empire begins to sink under its own weight. The Barbarians begin their eruptions, and the Goths have annual tribute not to molest the empire.
- 260 Valerius is taken prisoner by Sapor, king of Persia, and dead alive.
- 274 Silk first brought from India; the manufactory of it introduced into Europe by some monks, 551; first worn by the clergy in England, 1534.
- 291 Two emperors and two Cæsars march to defend the

- the four quarters of the empire.
- 306 Constantine the Great begins his reign.
- 308 Cardinals first began.
- 313 The tenth persecution ends by an edict of Constantine, who favours the Christians, and gives full liberty to their religion.
- 314 Three bishops, or fathers, are sent from Britain to assist at the council of Arles.
- 325 The first general council at Nice, when 318 fathers attended, against Arius, the founder of Arianism, where was composed the famous Nicene Creed, which we attribute to them.
- 328 Constantine removes the seat of empire from Rome to Byzantium, which is thereafter called Constantinople.
- 331 ——— orders all the heathen temples to be destroyed.
- 363 The Roman emperor Julian, surnamed the Apostate, endeavours in vain to rebuild the temple of Jerusalem.
- 364 The Roman empire is divided into the eastern (Constantinople the capital) and western, (of which Rome continued to be the capital), each being now under the government of different emperors.
- 400 Bells invented by bishop Paulinus, of Campagna.
- 404 The kingdom of Caledonia or Scotland revives under Fergus.
- 406 The Vandals, Alans, and Suevi, spread into France and Spain, by a concession of Honorius, emperor of the West.
- 410 Rome taken and plundered by Alaric, king of the Visi-Goths.
- 412 The Vandals begin their kingdom in Spain.
- 420 The kingdom of France begins upon the Lower Rhine, under Pharamond.
- 426 The Romans, reduced to extremities at home, withdraw their troops from Britain, and never return; advising the Britons to arm in their own defence, and trust to their own valour.
- 446 The Britons, now left to themselves, are greatly harassed by the Scots and Picts, upon which they once more make their complaint to the Romans, (which they entitle, *The Complaints of the Britons*), but receive no assistance from that quarter.
- 447 Attila (surnamed the Scourge of God) with his Huns ravage the Roman empire.
- 449 Vortigern, king of the Britons, invites the Saxons into Britain, against the Scots and Picts.
- 455 The Saxons having repulsed the Scots and Picts invite over more of their countrymen, and begin to establish themselves in Kent, under Hengist.
- 476 The western empire is finished, 523 years after the battle of Pharsalia; upon the ruins of which several new states arise in Italy and other parts, consisting of Goths, Vandals, Huns, and other barbarians, under whom literature is extinguished, and the works of the learned are destroyed.
- 496 Clovis, king of France, baptized, and Christianity begins in that kingdom.
- 508 Prince Arthur begins his reign over the Britons.
- 513 Constantinople besieged by Vitalianus, whose fleet is burnt by a speculum of brass.
- 516 The computing of time by the Christian era is introduced by Dionysius the monk.
- 529 The codex of Justinian, the eastern emperor, is published.
- 557 A terrible plague all over Europe, Asia, and Africa, which continues near fifty years.
- 581 Latin ceased to be spoke about this time in Italy.
- 596 Augustin the monk comes into England with forty monks.
- 606 Here begins the power of the popes, by the concessions of Phocas, emperor of the East.
- 622 Mahomet, the false prophet, flies from Mecca to Medina, in Arabia, in the 44th year of his age, and 10th of his ministry, when he laid the foundation of the Saracen empire, and from whom the Mahometan princes to this day claim their descent. His followers compute their time from this era, which in Arabic is called *hegira*, i. e. "the Flight."
- 637 Jerusalem is taken by the Saracens or followers of Mahomet.
- 640 Alexandria in Egypt is taken by ditto, and the grand library there burnt by order of Omar their caliph or prince.
- 653 The Saracens now extend their conquests on every side, and retaliate the barbarities of the Goths and Vandals upon their posterity.
- 664 Glass invented in England by Benet a monk.
- 685 The Britons, after a brave struggle of near 150 years, are totally expelled by the Saxons, and drove into Wales and Cornwall.
- 713 The Saracens conquer Spain.
- 726 The controversy about images begins, and occasions many insurrections in the eastern empire.
- 748 The computing of years from the birth of Christ began to be used in history.
- 749 The race of Abbas became caliphs of the Saracens, and encourage learning.
- 762 The city of Bagdad upon the Tigris, is made the capital for the caliphs of the house of Abbas.
- 800 Charlemagne, king of France, begins the empire of Germany, afterwards called the Western empire; gives the present names to the winds and months; endeavours to restore learning in Europe, but mankind are not yet disposed for it, being solely engrossed in military enterprizes.
- 826 Harold, king of Denmark, dethroned by his subjects, for being a Christian.
- 828 Egbert, king of Wessex, unites the heptarchy, by the name of England.
- 836 The Flemings trade to Scotland for fish.
- 838 The Scots and Picts have a decisive battle, in which the former prevail, and both kingdoms are united by Kenneth, which begins the second period of the Scottish history.
- 867 The Danes begin their ravages in England.
- 896 Alfred the Great, after subduing the Danish invaders, (against whom he fought 56 battles by sea and land), composes his body of laws; divides

Aft. Christ.

Aft. Christ.

- divides England into counties, hundreds, tythings; erects county-courts, and founds the university of Oxford about this time.
- 915 The university of Cambridge founded.
- 936 The Saracen empire is divided by usurpation into seven kingdoms.
- 975 Pope Boniface VII. is deposed and banished for his crimes.
- 979 Coronation oath first used in England. Juries first instituted in ditto.
- 991 The figures in arithmetic are brought into Europe by the Saracens from Arabia; letters of the alphabet were hitherto used.
- 996 Otho III. makes the empire of Germany elective.
- 999 Boleslaus, the first king of Poland.
- 1000 Paper made of cotton rags was in use; that of linen rags in 1170: the manufactory introduced into England at Dartford, 1588.
- 1005 All the old churches are rebuilt about this time in a new manner of architecture.
- 1015 Children forbidden by law to be sold by their parents in England.
- 1017 Canute, king of Denmark, gets possession of England.
- 1040 The Danes, after several engagements with various successs, are about this time driven out of Scotland, and never again return in a hostile manner.
- 1041 The Saxon line restored under Edward the Confessor.
- 1043 The Turks (a nation of adventurers from Tartary, serving hitherto in the armies of contending princes) become formidable, and take possession of Persia.
- 1054 Leo IX. the first pope that kept up an army.
- 1057 Malcolm III. king of Scotland, kills the tyrant Macbeth at Dunlincane, and marries the princess Margaret, sister to Edgar Atheling.
- 1065 The Turks take Jerusalem from the Saracens.
- 1066 The conquest of England by William (surnamed the Bastard) duke of Normandy, in the battle of Hastings, where Harold is slain.
- 1070 William introduces the feudal law. Musical notes invented.
- 1075 Henry IV. emperor of Germany, and the pope, quarrel about the nomination of the German bishops. Henry, in penance, walks barefooted to the pope towards the end of January.
- 1076 Justices of the peace first appointed in England.
- 1080 Doomday-book began to be compiled by order of William, from a survey of all the estates in England, and finished in 1086. The Tower of London built by ditto, to curb his English subjects; numbers of whom fly to Scotland, where they introduce the Saxon or English language, are protected by Malcolm, and have lands given them.
- 1091 The Saracens in Spain, being hard pressed by the Spaniards, call to their assistance Joseph, king of Morocco; by which the Moors get possession of all the Saracen dominions in Spain.
- 1096 The first crusade to the Holy Land is begun under several Christian princes, to drive the infidels from Jerusalem.
- 1110 Edgar Atheling, the last of the Saxon princes, dies in England, where he had been permitted to reside as a subject.
- 1118 The order of the Knights Templars instituted, to defend the Sepulchre at Jerusalem, and to protect Christian strangers.
- 1151 The canon law collected by Gratian, a monk of Bologna.
- 1163 London bridge, consisting of 19 small arches, first built of stone.
- 1164 The Tontonic order of religious knights begins in Germany.
- 1172 Henry II. king of England, (and first of the Plantagenets) takes possession of Ireland; which, from that period, has been governed by an English viceroy, or lord lieutenant.
- 1176 England is divided, by Henry, into six circuits, and justice is dispensed by itinerant judges.
- 1180 Glass windows began to be used in private houses in England.
- 1181 The laws of England are digested about this time by Glanville.
- 1182 Pope Alexander III. compelled the kings of England and France to hold the stirrups of his saddle when he mounted his horse.
- 1186 The great conjunction of the sun and moon and all the planets in Libra, happened in September.
- 1192 The battle of Alcalon, in Judea, in which Richard, king of England, defeats Saladin's army, consisting of 300,000 combatants.
- 1194 *Dieu et mon Droit*, first used as a motto by Richard, on a victory over the French.
- 1200 Chivalries were not known in England. Surnames now began to be used; first among the nobility.
- 1208 London incorporated, and obtained their first charter for electing their Lord Mayor and other magistrates from king John.
- 1215 Magna Charta is signed by king John and the barons of England. Court of common pleas established.
- 1227 The Tartars, a new race of heroes, under Gengis-Kan, emerge from the northern parts of Asia, over-run all the Saracen empire; and, in imitation of former conquerors, carry death and desolation wherever they march.
- 1233 The Inquisition begun in 1204, is now trusted to the Dominicans. The houses of London, and other cities in England, France, and Germany, still thatched with straw.
- 1253 The famous astronomical tables are composed by Alfonso, king of Castile.
- 1258 The Tartars take Bagdad, which finishes the empire of the Saracens.
- 1263 Acho, king of Norway, invades Scotland with 160 sail, and lands 20,000 men at the mouth of the Clyde, who are cut to pieces by Alexander III. who recovers the western isles.
- 1264 The commons of England first summoned to parliament about this time.

- Aft. Christ.
- 1269 The Hamburg company incorporated in England.
- 1273 The empire of the present Austrian family begins in Germany.
- 1282 Lewellyn, prince of Wales, defeated and killed by Edward I. who unites that principality to England.
- 1284 Edward II. born at Carnarvon, is the first prince of Wales.
- 1285 Alexander III. king of Scotland, dies, and that kingdom is disputed by twelve candidates, who submit their claims to the arbitration of Edward, king of England; which lays the foundation of a long and desolating war between both nations.
- 1293 There is a regular succession of English parliaments from this year, being the 22^d of Edward I.
- 1298 The present Turkish empire begins in Bithynia under Ottoman.
Silver-hafted knives, spoons, and cups, a great luxury.
Tallow candles so great a luxury, that splinters of wood were used for lights.
Wine sold by apothecaries as a cordial.
- 1302 The mariner's compass invented, or improved by Givias, of Naples.
- 1307 The beginning of the Swiss cantons.
- 1308 The popes remove to Avignon in France for 70 years.
- 1310 Lincoln's inn society established.
- 1314 The battle of Bannockburn, between Edward II. and Robert Bruce, which establishes the latter on the throne of Scotland.
The cardinals set fire to the conclave and separate.
A vacancy in the papal chair for two years.
- 1320 Gold first coined in Christendom; 1344 ditto in England.
- 1336 Two Brabant weavers settle at York, which, says Edward III. may prove of great benefit to us and our subjects.
- 1337 The first comet whose course is described with an astronomical exactness.
- 1340 Gunpowder and guns first invented by Swartz, a monk of Cologn; 1346 Edward III. had four pieces of cannon, which gained him the battle of Cressy; 1346, bombs and mortars were invented.
Oil painting first made use of by John Vanneck.
Heralds college instituted in England.
- 1344 The first creation to titles by patents used by Edward III.
- 1346 The battle of Durham, in which David, king of Scots, is taken prisoner.
- 1349 The order of the Garter instituted in England by Edward III. altered in 1557, and consists of 26 knights.
- 1352 The Turks first enter Europe.
- 1354 The money in Scotland till now the same as in England.
- 1356 The battle of Poitiers, in which king John of France and his son are taken prisoners by Edward the Black Prince.
- 1357 Coals first brought to London.
- 1358 Arms of England and France first quartered by Aft. Christ. Edward III.
- 1362 The law pleadings in England changed from French to English as a favour of Edward III. to his people.
John Wickliffe an Englishman begins to call in question the doctrines of the church of Rome about this time, whose followers are called Lollards.
- 1386 A company of linen weavers from the Netherlands established in London.
Windfor castle built by Edward III.
- 1388 The battle of Otterburn between Hotspur and the earl of Douglas.
- 1391 Cards invented in France for the king's amusement.
- 1399 Westminster abbey rebuilt and enlarged—Westminster hall ditto.
Order of the Bath instituted at the coronation of Henry IV. renewed in 1725; consisting of 38 knights.
- 1410 Guildhall, London, built.
- 1411 The university of St Andrew's in Scotland founded.
- 1415 The battle of Agincourt gained over the French by Henry V. of England.
- 1428 The siege of Orleans, the first blow to the English power in France.
- 1440 Printing invented by L. Koster at Harlaem in Holland; brought into England by W. Caxton, a mercer of London, 1471.
- 1446 The Vatican library founded at Rome.
The sea breaks in at Dort, in Holland, and drowns 100,000 people.
- 1453 Constantinople taken by the Turks, which ends the eastern empire, 1123 years from its dedication by Constantine the Great, and 2206 years from the foundation of Rome.
- 1454 The university of Glasgow in Scotland founded.
- 1460 Engraving and etching on copper invented.
- 1477 The university of Aberdeen in Scotland founded.
- 1483 Richard III. king of England, and last of the Plantagenets, is defeated and killed at the battle of Bosworth, by Henry (Tudor) VII. which puts an end to the civil wars between the houses of York and Lancaster, after a contest of 30 years, and the loss of 100,000 men.
- 1486 Henry establishes fifty yeomen of the guards, the first standing army.
- 1489 Maps and sea charts first brought to England by Barth. Columbus.
- 1491 William Groceyn introduces the study of the Greek language into England.
The Moors, hitherto a formidable enemy to the native Spaniards, are entirely subdued by Ferdinand, and become subjects to that prince on certain conditions, which are ill observed by the Spaniards, whose clergy use the Inquisition in all its tortures; and in 1609, near one million of the Moors are driven from Spain to the opposite coast of Africa, from whence they originally come.
- 1492 America first discovered by Columbus, a Genoese, in the service of Spain.

- Aft. Christ. 1494 Algebra first known in Europe.
- 1497 The Portuguese first fail to the East Indies by the Cape of Good Hope.
South America discovered by Americus Vesputius, from whom it has its name.
- 1499 North America discovered, for Henry VII. by Cabot, a Venetian.
- 1500 Maximilian divides the empire of Germany into six circles, and adds four more in 1512.
- 1505 Shillings first coined in England.
- 1509 Gardening introduced into England from the Netherlands, from whence vegetables were imported hitherto.
- 1513 The battle of Flowden, in which James IV. king of Scotland is killed, with the flower of his nobility.
- 1517 Martin Luther began the Reformation.
Egypt is conquered by the Turks.
- 1518 Magellan, in the service of Spain, first discovers the straits of that name in South America.
- 1520 Henry VIII. for his writings in favour of popery, receives the title of Defender of the Faith from his Holiness.
- 1529 The name of Protestant takes its rise from the reformed protesting against the church of Rome, at the diet of Spires in Germany.
- 1534 The reformation takes place in England, under Henry VIII.
- 1537 Religious houses dissolved by ditto.
- 1539 The first English edition of the Bible authorized; the present translation finished 1611.
About this time cannon began to be used in ships.
- 1543 Silk stockings first worn by the French king; first worn in England by queen Eliz. 1561; the steel frame for weaving invented by the Rev. Mr Lee, of John's College, Cambridge, 1589.
Pins first used in England, before which time the ladies used skewers.
- 1544 Good lands let in England at one shilling per acre.
- 1545 The famous council of Trent begins, and continues 18 years.
- 1546 First law in England establishing the interest of money at 10 *per cent.*
- 1549 Lords lieutenants of counties instituted in England.
- 1550 Horse guards instituted in England.
- 1555 The Russian company established in England.
- 1558 Queen Elizabeth begins her reign.
- 1560 The reformation in Scotland completed by John Knox.
- 1563 Knives first made in England.
- 1569 Royal Exchange first built.
- 1572 The great massacre of Protestants at Paris.
- 1579 The Dutch shake off the Spanish yoke, and the republic of Holland begins.
English East-India company incorporated—established 1600.
—Turkey company incorporated.
- 1580 Sir Francis Drake returns from his voyage round the world, being the first English circumnavigator.
- Parochial register first appointed in England.
- 1582 Pope Gregory introduces the New Style in Italy; the 5th of October being counted 15.
- 1583 Tobacco first brought from Virginia into England.
- 1587 Mary queen of Scots is beheaded by order of Elizabeth, after 18 years imprisonment.
- 1588 The Spanish Armada destroyed by Drake and other English admirals.
Henry IV passes the edict of Nantes, tolerating the Protestants.
- 1589 Coaches first introduced into England; hackney act 1693; increased to 1000, in 1770.
- 1590 Band of pensioners instituted in England.
- 1591 Trinity college, Dublin, founded.
- 1597 Watches first brought into England from Germany.
- 1602 Decimal arithmetic invented at Bruges.
- 1603 Queen Elizabeth (the last of the Tudors) dies, and nominates James VI. of Scotland (and first of the Stuarts) as her successor; which unites both kingdoms under the name of Great Britain.
- 1605 The Gunpowder-plot discovered at Westminster; being a project of the Roman catholics to blow up the king and both houses of Parliament.
- 1606 Oaths of allegiance first administered in England.
- 1608 Galileo, of Florence, first discovers the satellites about the planet Saturn, by the telescope, then just invented in Holland.
- 1610 Henry IV. is murdered at Paris, by Ravallac, a priest.
- 1611 Barons first created in England by James I.
- 1614 Napier of Merchiston, in Scotland, invents the logarithms.
Sir Hugh Middleton brings the new river to London from Ware.
- 1616 The first permanent settlement in Virginia.
- 1619 W. Harvey, an Englishman, confirms the doctrine of the circulation of the blood, which had been first broached by Servetus, a French physician, in 1553.
- 1620 The broad silk manufacture from raw silk, introduced into England.
- 1621 New England planted by the Puritans.
- 1625 King James dies, and is succeeded by his son, Charles I.
The island of Barbadoes, the first English settlement in the West Indies, is planted.
- 1632 The battle of Lutzen, in which Gustavus Adolphus, king of Sweden, and head of the Protestants in Germany, is killed.
- 1635 Province of Maryland planted by lord Baltimore. Regular posts established from London to Scotland, Ireland, &c.
- 1640 King Charles disoblige his Scottish subjects, on which their army, under general Lesley, enters England, and takes Newcastle, being encouraged by the malecontents in England.
The massacre in Ireland, when 40,000 English Protestants were killed.
- 1642 King Charles impeaches five refractory members, which begins the civil wars in England.
- 1643 Excise on beer, ale, &c. first imposed by parliament.

Afr. Christ.

- 1649 Charles I. beheaded by Cromwell, at Whitehall, January 30, aged 49.
- 1654 Cromwell assumes the protectorship.
- 1655 The English, under admiral Penn, take Jamaica from the Spaniards.
- 1658 Cromwell dies, and is succeeded in the protectorship, by his son Richard.
- 1660 King Charles II. is restored by Monk, commander of the army, after an exile of twelve years, in France and Holland.
The people of Denmark, being oppressed by the nobles, surrender their privileges to Frederick III. who becomes absolute.
- 1662 The Royal Society, established at London, by Charles II.
- 1663 Carolina planted; 1728 divided into two separate governments.
- 1664 The New Netherlands, in North America, conquered from the Swedes and Dutch by the English.
- 1665 The plague rages in London, and carries off 68,000 persons.
- 1666 The great fire of London began Sept. 2, and continued three days, in which were destroyed 13,000 houses, and 400 streets.
Tea first used in England.
- 1667 The peace of Breda, which confirms to the English the New Netherlands, now known by the names of Pennsylvania, New York, and New Jersey.
- 1668 — ditto, Aix la Chapelle.
St James's Park planted, and made a thoroughfare for public use by Charles II.
- 1670 The English Hudson's Bay company incorporated.
- 1672 Lewis XIV. over-runs great part of Holland, when the Dutch opened their sluices, being determined to drown their country, and retire to their settlements in the East Indies.
African company established.
- 1678 The peace of Nimeguen.
The habeas corpus act passed.
- 1680 A great comet appeared, and from its nearness to our earth alarmed the inhabitants. It continued visible from Nov. 3, to March 9.
William Penn, a Quaker, receives a charter for planting Pennsylvania.
- 1683 India stock sold from 360 to 500 per cent.
- 1685 Charles II. dies, aged 55, and is succeeded by his brother James II.
The duke of Monmouth, natural son to Charles II. raises a rebellion, but is defeated at the battle of Sedgmore, and beheaded.
The edict of Nantes is revoked by Lewis XIV, and the Protestants are greatly distressed.
- 1687 The palace of Versailles, near Paris, finished by Lewis XIV.
- 1688 The Revolution in Great Britain begins Nov. 5. King James abdicates, and retires to France, December 3.
King William and queen Mary, daughter and son-in-law to James, are proclaimed February 16.
Viscount Dundee stands out for James in Scotland, but is killed by general Mackey, at the battle

of Killycrankie, upon which the Highlanders, Afr. Christ. wearied with repeated misfortunes, disperse.

- 1689 The land-tax passed in England.
The toleration act passed in ditto.
Several bishops are deprived for not taking the oaths to William.
William Fuller, who pretended to prove the Prince of Wales spurious, was voted by the commons to be a notorious cheat, impostor, and false accuser.
- 1690 The battle of the Boyne, gained by William against James, in Ireland.
- 1691 The war in Ireland finished, by surrender of Limerick to William.
- 1692 The English and Dutch fleets, commanded by Admiral Ruffell, defeat the French fleet off La Hogue.
- 1693 Bayonets at the end of loaded muskets first used by the French against the confederates in the battle of Turin.
The duchy of Hanover made the ninth electorate.
Bank of England established by king William.
The first public lottery was drawn this year.
Massacre of Highlanders at Glencoe, by king William's army.
- 1694 Queen Mary dies at the age of 33, and William reigns alone.
Stamp duties instituted in England.
- 1696 The peace of Ryfwick.
- 1699 The Scots settled a colony at the isthmus of Darien, in America, and called it Caledonia.
- 1700 Charles XII. of Sweden, begins his reign.
King James II. dies at St Germain's, in the 68th year of his age.
- 1701 Prussia erected into a kingdom.
Society for the propagation of the gospel in foreign parts established.
- 1702 King William dies, aged 50, and is succeeded by queen Anne, daughter to James II. who, with the Emperor and States General, renews the war against France and Spain.
- 1704 Gibraltar taken from the Spaniards, by admiral Rooke.
The battle of Blenheim, won by the duke of Marlborough and allies, against the French.
The court of Exchequer instituted in England.
- 1706 The treaty of Union betwixt England and Scotland, signed July 22.
The battle of Ramillies won by Marlborough and the allies.
- 1707 The first British parliament.
- 1708 Minorca taken from the Spaniards by general Stanhope.
The battle of Oudenarde won by Marlborough and the allies.
Sardinia erected into a kingdom, and given to the duke of Savoy.
- 1709 Peter the Great, czar of Muscovy, defeats Charles XII. at Pultowa, who flies to Turkey.
The battle of Malplaquet won by Marlborough and the allies.
- 1710 Queen Anne changes the Whig ministry for others more favourable to the interest of her brother, the late Pretender.

- Aft. Christ. 1710 The cathedral church of St Paul, London, rebuilt by Sir Christopher Wren, in 37 years, at one million expence, by a duty on coals.
The English South-Sea company began.
- 1712 Duke of Hamilton and lord Mohun killed in a duel in Hyde-Park.
- 1713 The peace of Utrecht, whereby Newfoundland, Nova-Scotia, New-Britain, and Hudfon's-Bay, in North America, were yielded to Great Britain; Gibraltar and Minorca, in Europe, were also confirmed to the said crown by this treaty.
- 1714 Queen Anne dies, at the age of 50, and is succeeded by George I.
Interest reduced to five per cent.
- 1715 Lewis XIV. dies, and is succeeded by his great-grandson Lew. is XV. the late king of France.
The rebellion in Scotland begins in September under the earl of Mar, in favour of the Pretender. The action of Sheriff-muir, and the surrender of Preston, both in November, when the rebels disperse.
- 1716 The Pretender married the princess Sobieska, grand-daughter of John Sobieski, late king of Poland.
An act passed for septennial parliaments.
- 1719 The Mississippi scheme at its height in France.
Lombe's silk-throwing machine, containing 26,586 wheels, erected at Derby: takes up one-eighth of a mile; one water-wheel moves the rest; and in 24 hours, it works 318,504,960 yards of organzine silk thread.
The South-Sea scheme in England begun April 7. was at its height at the end of June, and quite sunk about September 29.
- 1727 King George dies, in the 68th year of his age; and is succeeded by his only son, George II.
Inoculation first tried on criminals with success. Russia, formerly a dukedom, is now established as an empire.
- 1732 Kouli Khan usurps the Persian throne, conquers the Mogul empire, and returns with two hundred thirty-one millions Sterling.
Several public-spirited gentlemen begin the settlement of Georgia, in North America.
- 1736 Capt. Porteous having ordered his soldiers to fire upon the populace at an execution of a smuggler, is himself hanged by the mob at Edinburgh.
- 1738 Westminster bridge, consisting of 15 arches, begun; finished in 1750, at the expence of 389,000*l.* defrayed by parliament.
- 1739 Letters of marque issued out in Britain against Spain, July 27, and war declared Oct. 23.
- 1743 The battle of Dettingen won by the English and allies, in favour of the queen of Hungary.
- 1744 War declared against France.—Commodore Anson returns from his voyage round the world.
- 1745 The allies lose the battle at Fontenoy.
The rebellion breaks out in Scotland, and the Pretender's army defeated by the duke of Cumberland, at Culloden, April 16, 1746.
- 1746 British Linen Company erected.
- 1748 The peace of Aix-la-Chapelle, by which a restitution of all places taken during the war, was to be made on all sides.
- 1749 The interest on the British funds reduced to 3 per cent.
British herring-fishery incorporated.
- 1751 Frederic, prince of Wales, father to his present majesty, died.
Antiquarian society at London incorporated.
- 1752 The new stile introduced into Great Britain; the 3^d of September being counted the 14th.
- 1753 The British museum erected at Montague-house.
Society of arts, manufactures, and commerce, instituted in London.
- 1755 Lisbon destroyed by an earthquake.
- 1756 146 Englishmen are confined in the black hole at Calcutta, in the East Indies, by order of the nabob, and 123 found dead next morning.
Marine society established at London.
- 1757 Damien attempted to assassinate the French king.
- 1759 General Wolf is killed in the battle of Quebec, which is gained by the English.
- 1760 King George II. dies October 25, in the 77th year of his age, and is succeeded by his present majesty, who, on the 22^d of September, 1761, married the princess Charlotte, of Mecklenburgh Strelitz.
Black-friars bridge, consisting of 9 arches, begun; finished 1770, at the expence of 152,840*l.* to be discharged by a toll.
- 1762 War declared against Spain.
Peter III. emperor of Russia, is deposed, imprisoned, and murdered.
American philosophical society established in Philadelphia.
George Augustus Frederic, prince of Wales, born Aug. 12.
- 1763 The definitive treaty of peace between Great-Britain, France, Spain, and Portugal, concluded at Paris, February 10, which confirms to Great-Britain the extensive provinces of Canada, East and West Florida, and part of Louisiana, in North America; also the islands of Granada, St Vincent, Dominica, and Tobago, in the West Indies.
- 1764 The parliament granted 10,000*l.* to Mr Harrison, for his discovery of the longitude by his time-piece.
- 1765 His majesty's royal charter passed for incorporating the society of artists.
An act passed annexing the sovereignty of the island of Man to the crown of Great Britain.
- 1766 April 21, a spot or macula of the sun, more than thrice the bigness of our earth, passed the sun's center.
- 1768 Academy of painting established in London.
The Turks imprison the Russian ambassador, and declare war against that empire.
- 1771 Dr Solander and Mr Banks, in his majesty's ship the Endeavour, lieut. Cooke, return from a voyage round the world, having made several important discoveries in the South-Seas.
- 1772 The king of Sweden changes the constitution from aristocracy to a limited monarchy.
The pretender marries a princess of Germany, grand-daughter of Thomas, late Earl of Aylbury.
- The emperor of Germany, empress of Russia,

and the king of Prussia, strip the king of Poland of a great part of his dominions, which they divide among themselves, in violation of the most solemn treaties.

- 1773 Captain Phipps is sent to explore the North Pole, but having made 81 degrees, is in danger of being locked up by the ice, and his attempt to discover a passage in that quarter proves fruitless.

The Jesuits expelled from the Pope's dominions. The English East India company having, by conquest or treaty, acquired the extensive provinces of Bengal, Orixa, and Bahar, containing 15 millions of inhabitants, great irregularities are committed by their servants abroad; upon which government interferes, and sends out judges, &c. for the better administration of justice.

- 1773 The war between the Russians and the Turks Aft. Christ. proves disgraceful to the latter, who lose the islands in the Archipelago, and by sea are every where unsuccessful.
- 1774 Peace is proclaimed between the Russians and Turks.
- The British parliament having passed an act, laying a duty of 3 d. per pound upon all teas imported into America; the colonists, considering this as a grievance, deny the right of the British parliament to tax them.
- 1775 The American colonies send deputies to Philadelphia, who assume the title of *The Congress of the Thirteen United Provinces*, and all the powers of government.
- 1776 The congress declare the *United States of America* independent of the crown and parliament of Great Britain.

C H R

CHRONOMETER, in general, denotes any instrument or machine used in measuring time; such are dials, clocks, watches, &c. See DIAL, &c.

The term *chronometer*, however, is generally used in a more limited sense, for a kind of clock so contrived as to measure a small portion of time with great exactness, even to the sixteenth part of a second: of such a one there is a description in Desaguliers's experimental philosophy, invented by the late ingenious Mr George Graham; which must be allowed to be of great use for measuring small portions of time in astronomical observations, the time of the fall of bodies, the velocity of running waters, &c. But long spaces of time cannot be measured by it with sufficient exactness, unless its pendulum be made to vibrate in a cycloid; because, otherwise it is liable to err considerably, as all clocks are which have short pendulums that swing in large arches of a circle.

There have been several machines contrived for measuring time, under the name of *chronometers*, upon principles very different from those on which clocks and watches are constructed.

Plate LXXXII. fig. 4. represents an *air-chronometer*, which is constructed in the following manner. Provide a glass tube of about an inch in diameter, and three or four feet long: the diameter of the inside of this tube must be precisely equal in every part: at the bottom must be a small hole, closely covered with a valve. In the tube place a piston E, fig. 5. which is made to fit it exactly, and must be oiled, that it may move in the tube with the greatest freedom: in this piston there is a cock that shuts quite close; and from the top of it there goes a cord F, which passes through the handle G. The cock of the piston being closed, it is to be let down to the bottom of the tube; and being then drawn up to the top, the air will then rush in by the valve at the bottom of the tube, and support the piston. You are then to turn the cock, so as to make a very small vent; and the air passing slowly through that vent, the piston will gradually descend, and shew the hour, either by lines cut in the tube with a diamond, or marked with paint, or by small slips of paper painted on the glass. If this chronometer should go too fast or too slow, it may be easily regulated by

C H R

altering the position of the cock in the piston, as it is on that the whole depends.

If, instead of marking the tube, you would have the time shown by a dial, it may be easily effected by placing an axis to which the hand of the dial is fixed, directly over the tube, and winding the string to which the piston is joined, round that axis; for then, as the piston descends, the axis will gradually turn the hand, and show the hour: but it must be observed, that as the descent of the piston is not constantly regular, on account of the decrease of resistance from the quantity of the subjacent air as the piston descends, the axis therefore must not be a regular cylinder, but conical like the fusee of a watch, as in fig. 6. by which means the motion of the hand of the dial will be constant and regular.

Fig. 7. represents a lamp-chronometer. It consists of a chamber lamp A, which is a cylindrical vessel about three inches high, and one inch diameter, placed in the stand B. The inside of this vessel must be every where exactly of the same diameter. To the stand B is fixed the handle C, which supports the frame DEFG, about 12 inches high, and four wide. This frame is to be covered with oiled paper, and divided into twelve equal parts by horizontal lines; at the end of which are wrote the numbers for the hours, from 1 to 12, and between the horizontal lines are diagonals that are divided into halves, quarters, &c. On the handle B, and close to the glass, is fixed the style or gnomon H. Now, as the distance of the style from the flame of the lamp is only half an inch, if the distance of the frame from the style is only six inches, then, while the float that contains the light descends, by the decrease of the oil, one inch, the shadow of the style on the frame will ascend twelve inches, that is, its whole length, and show by its progression the regular increase of the hours, with their several divisions. It is absolutely necessary, however, that the oil used in this lamp be always of the same sort and quite pure, and that the wick also be constantly of the same size and substance, as it is on these circumstances, and the uniform figure of the vessel, that the regular progress of the shadow depends.

CHRONOMETER, among musicians, an instrument invented

Chronometer—invented by *Loudie*, a French musician, for the purpose of measuring time by means of a pendulum. The form of the instrument as described by him, is that of an Ionic pilaster, and is thus described by Malcolm in his treatise of Music, p. 407.—“The chronometer consists of a large ruler or board, six feet or 72 inches long, to be set on end; it is divided into its inches, and the numbers set so as to count upwards; and at every division there is a small round hole, through whose center the line of division runs. At the top of this ruler, about an inch above the division 72, and perpendicular to the ruler, is inserted a small piece of wood, in the upper side of which there is a groove, hollowed along from the end that stands out to that which is fixed in the ruler, and near each end of it a hole is made: through these holes a pendulum cord is drawn, which runs in the groove; at that end of the cord which comes through the hole furthest from the ruler, the ball is hung; and at the other end there is a small wooden pin, which can be put in any of the holes of the ruler: when the pin is in the uppermost hole at 72, then the pendulum from the top to the centre of the ball must be exactly 72 inches; and therefore, whatever hole of the ruler it is put in, the pendulum will be just so many inches as that figure at the hole denotes. The manner of using the machine is this: The composer lengthens or shortens his pendulum, till one vibration be equal to the designed length of his bar, and then the pin stands at a certain division, which marks the length of the pendulum; and this number being set with the clasp at the beginning of the song, is a direction for others how to use the chronometer in measuring the time according to the composer's design: for with the number is set the note, crotchet, or minim, whose value he would have the vibration to be; which in brisk duple time is best a minim or half bar, or even a whole bar, when that is but a minim; and in slow time, a crotchet. In triple time, it would do well to be the third part or half, or fourth part of a bar; and in the simple triples that are allegro, let it be a whole bar. And if, in every time that is allegro, the vibration is applied to a whole or half bar, practice will teach us to subdivide it justly and equally. Observe, that, to make this machine of universal use, some canonical measure of the divisions must be agreed upon, that the figure may give a certain direction for the length of the pendulum.

CHROSTASIMA, in natural history, a genus of pellucid gems, comprehending all those which appear of one simple and permanent colour in all lights; such are the diamond, carbuncle, ruby, garnet, amethyst, sapphire, beryl, emerald, and the topaz. See **DIAMOND**, **CARBUNCLE**, &c.

CHRYALIS, or **AURELIA**, in natural history, a state of rest and seeming insensibility, which butterflies, moths, and several other kinds of insects, must pass through before they arrive at their winged or most perfect state.

In this state, no creatures afford so beautiful a variety as the butterfly kinds, and they all pass through this middle state without one exception. The figure of the aurelia or chrysalis generally approaches to that of a cone, or at least the hinder part of it is in this

shape; and the creature, while in this state, seems to have neither legs nor wings, nor has any power of walking. It seems indeed to have hardly so much as life. It takes no nourishment in this state, nor has it any organs for taking any; and indeed its posterior part is all that seems animated, this having a power of giving itself some motions. The external covering of the chrysalis is cartilaginous, and considerably large, and is usually smooth and glossy; but some few of them have a few hairs; some are also as hairy as the caterpillars from which they are produced; and others are rough, and, as it were, flangeered all over.

In all of these there may be distinguished two sides; the one of which is the back, the other the belly of the animal. On the anterior part of the latter, there may always be distinguished certain little elevations running in ridges, and resembling the fillets found about mummies: the part whence these have their origin, is esteemed the head of the animal. The other side, or back, is smooth, and of a rounded figure in most of the chrysalises; but some have ridges on the anterior part, and sides of this part; and these usually terminate in a point, and make an angular appearance on the chrysalis.

From this difference is drawn the first general distinction of these bodies. They are by this divided into two classes; the round and the angular kinds. The first are, by the French naturalists, called *ferres*; from the common custom of calling the chrysalis of the silkworm, which is round, by this name.

There is something more regular in this distinction than might at first be conceived; for the division is continued from the fly-state: the rounded chrysalises being almost all produced by the *phalena* or moths; and the angular ones by the *papilio*, or day-flies. There are several subordinate distinctions of these kinds; but, in general, they are less different from one another than the caterpillars from whence they are produced.

The head of those of the first class usually terminates itself by two angular parts, which stand separate one from the other, and resemble a pair of horns. On the back, eminences and marks are discovered, which imagination may form into eyes, nose, chin, and other parts of the human face.

There is a great variety and a great deal of beauty in the figures and arrangement of the eminences and spots on the other part of the body of the chrysalises of different kinds. It is a general observation, that those chrysalises which are terminated by a single horn, afford day-butterflies of the kind of those which have buttoned antennæ, and whose wings, in a state of rest, cover the under part of their body, and which use all their six legs in walking, those of many other kinds using only four of them. Those chrysalises which are terminated by two angular bodies, and which are covered with a great number of spines, and have the figure of a human face on their back in the greatest perfection, afford butterflies of the day-kind; and of that class the characters of which are, their walking on four legs, and using the other two, that is, the anterior part, in the manner of arms or hands. The chrysalises which have two angular bodies on their heads, but shorter than those of the preceding, and whose

Chrysalis.

Chrysalis.

whose back shews but a faint sketch of the human face, and which have fewer spines, and those less sharp, always turn to that sort of butterfly the upper wings of which are divided into segments, one of which is so long as to represent a tail, and whose under wings are folded over the upper part of the back. A careful observation will establish many more rules of this kind, which are not so perfect as to be free from all exceptions; yet are of great use, as they teach us in general what sort of fly we are to expect from the chrysalis, of which we know not the caterpillar, and therefore can only judge from appearances.

These are the principal differences of the angular chrysalises; the round ones also have their different marks not less regular than those.

The greater number of the round chrysalises have the hinder part of their body of the figure of a cone; but the upper end, which ought to be its circular plane base, is usually bent and rounded into a sort of knee: this is usually called the head of the chrysalis; but there are also some of this kind, the head of which is terminated by a nearly plane surface: some of the creeping ten-legged caterpillars give chrysalises of this kind, which have each of them two eminences that seem to bring them towards the angular kind.

Among the angular chrysalises there are some whose colours seem as worthy our observation as the shapes of the others. Many of them appear superbly clothed in gold. These elegant species have obtained the name of *chrysalis* and *aurelia*, which are derived from Greek and Latin words, signifying gold; and from these all other bodies of the same kind have been called by the same names, though less, or not at all, entitled to them. As some kinds are thus gilded all over, so others are ornamented with this gay appearance in a more sparing manner, having only a few spots of it in different places on their back and belly. These obvious marks, however, are not to be depended upon as certain characters of distinction: for accidents in the formation of the chrysalis may alter them; and those which naturally would have been gilded all over, may be sometimes only so in part; and either these or the others may, by accident, be so formed, as to shew nothing of this kind at all, but be only of a dusky brown. Those, however, which have neither silver nor gold to recommend them to your eyes, do not want other colours, and those beautifully variegated. Some of them are all over of an elegant green, as is the chrysalis of the fennel-caterpillar; others of an elegant yellow; and some of a bright-greenish tinge, variegated with spots of a shining black: we have a very beautiful instance of this last kind in the chrysalis of the elegant cabbage-caterpillar. The general colour of the chrysalis of the common butterflies, however, is brown.

Some are also of a fine deep black; and of these many are so smooth and glossy, that they are equal to the finest Indian jasper. The common caterpillar of the fig-tree gives an instance of one of these most beautiful glossy ones; the caterpillar of the vine affords another of these fine black chrysalises.

The rounded chrysalises do not afford any thing of that variety of colouring so remarkably beautiful in the angular ones; they are usually of a dusky yellow,

in different shades, and are often variously spotted with black: but these, as well as all other chrysalises, before they arrive at their fixed colour, pass through several other temporary ones; some being of a different colour when first produced from the caterpillar, from what they are a few days afterwards; and some varying so greatly, though only in degree, as not to be distinguishable, even by the most conversant eye, from what they were when first produced. The green rough caterpillar of the cabbage has a chrysalis which is green at first; and from that gradually goes through all the shades of green to a faint yellow, which is its lasting colour; and one of the oak caterpillars yields a chrysalis beautifully spotted with red at its first appearance; but these spots change to brown for their fixed colour: the third day from their formation usually fixes their lasting colours; and if they are observed to turn black in any part after this time, it is a sign that they are dead or dying.

The several species of insects, as a fly, spider, and an ant, do not differ more evidently from one another in regard to appearance, than do a caterpillar, its chrysalis, and a butterfly produced from it; yet it is certain, that these are all the product of the same individual egg; and nothing is more certain, than that the creature which was for a while a caterpillar, is, after a certain time, a chrysalis, and then a butterfly. These great changes produced in so sudden a manner, seem like the *metamorphoses* recorded in the fables of the ancients; and indeed it is not improbable that those fables first took their origin from such changes.

The parts being distinguishable in the chrysalis, we easily find the difference of the species of the fly that is to proceed from it. The naked eye shews whether it be one of those that have, or of those that have not, a trunk; and the assistance of a microscope shews the antennæ so distinctly, that we are able to discern whether it belongs to the day or night-class; and often to what genus, if not the very species: nay, in the plumose horned kinds, we may see, by the antennæ, whether a male or female phalena is to be produced from the chrysalis; the horns of the female being in this state evidently narrower, and appearing less elevated above the common surface of the body, than those of the male.

All these parts of the chrysalis, however, though seen very distinctly, are laid close to one another, and seem to form only one mass; each of them is covered with its own peculiar membrane in this state, and all are surrounded together by a common one; and it is only through these that we see them; or rather we see on these the figures of all the parts moulded within, and therefore it requires attention to distinguish them. The chrysalis is soft when first produced, and is wetted on the front with a viscous liquor; its skin, though very tender at first, dries and hardens by degrees: but this viscous liquor which surrounds the wings, legs, &c. hardens almost immediately; and in consequence fastens all those limbs, &c. into a mass, which were before loose from one another: this liquor, as it hardens, loses its transparency, and becomes brown; so that it is only while it is yet moist that these parts are to be seen distinct.

Chrysalis.

Chrysalis.

It is evident from the whole, that the chrysalis is no other than a butterfly, the parts of which are hid under certain inembranes which fasten them together ; and, when the limbs are arrived at their due strength, they become able to break through these membranes, and then expand and arrange themselves in their proper order.

The first metamorphosis, therefore, differs nothing from the second, except that the butterfly comes from the body of the caterpillar in a weak state, with limbs unable to perform their offices, whereas it comes from the chrysalis perfect.

Hist. of Insects, vol. i. p. 2—28.

M. Reaumur has given us many curious observations on the structure and uses of the several coverings that attend the varieties of the caterpillar-kind in this state.

The creatures in general remain wholly immovable in this state, and seem to have no business in it but a patient attendance on the time when they are to become butterflies ; and this is a change that can happen to them, only as their parts, before extremely soft and weak, are capable of hardening and becoming firm by degrees, by the transpiration of that abundant humidity which before kept them soft : and this is proved by an experiment of M. Reaumur, who, inclosing some chrysalides in a glass tube, found, after some time, a small quantity of water at the bottom of it ; which could have come there no other way, but from the body of the inclosed animal. This transpiration depends greatly on the temperature of the air ; it is increased by heat, and diminished by cold ; but it has also its peculiarities in regard to the several species of butterfly to which the chrysalis belongs.

According to these observations, the time of the duration of the animal in the chrysalis state must be, in different species, very different ; and there is indeed this wide difference in the extremes, that some species remain only eight days in this state, and others eight months.

We know that the caterpillar changes its skin four or five times during its living in that state ; and that all these skins are at first produced with it from the egg, lying closely over one another. It parts with, or throws off all these one by one, as the butterfly, which is the real animal, all this time within, grows more and more perfect in the several first changes. When it throws off one, it appears in another skin exactly of the same form ; but at its final change from this appearance, that is, when it throws off the last skin, as the creature within is now arrived at such a degree of perfection as to need no farther taking of nourishment, there is no farther need of teeth, or any of the other parts of a caterpillar. The creature, in this last change, proceeds in the very same manner as in all the former, the skin opening at the back, and the animal making its way out in this shape. If a caterpillar, when about to throw off this last skin, be thrown into spirits of wine, and left there for a few days, the membranes within will harden, and the creature may be afterwards carefully opened, and the chrysalis taken out, in which the form of the tender butterfly may be traced in all its lineaments, and its eyes, legs, &c. evidently seen. It is not necessary, however, to seize upon this exact time for proving

the existence of the chrysalis or butterfly in the caterpillar : for if one of these animals be thrown into spirit of wine, or into vinegar, some days before that time, and left there for the flesh to harden, it may afterwards be dissected, and all the lineaments of the butterfly traced out in it ; the wings, legs, antennæ, &c. being as evident here, and as large, as in the chrysalis.

It is very plain from this, that the change of the caterpillar into chrysalis is not the work of a moment ; but is carrying on for a long time before, even from the very hatching of the creature from the egg. The parts of the butterfly, however, are not disposed exactly in the same manner while in the body of the caterpillar, as when left naked in the form of the chrysalis : for the wings are proportionally longer and narrower, being wound up into the form of a cord ; and the antennæ are rolled up on the head ; the trunk is also twisted up and laid upon the head ; but this in a very different manner from what it is in the perfect animal, and very different from that in which it lies within the chrysalis ; so that the first formation of the butterfly in the caterpillar, by time arrives at a proper change of the disposition of its parts, in order to its being a chrysalis. The very eggs, hereafter to be deposited by the butterfly, are also to be found not only in the chrysalis, but in the caterpillar itself, arranged in their natural, regular order. They are indeed in this state very small and transparent ; but after the change into the chrysalis, they have their proper colour.

As soon as the several parts of the butterfly, therefore, are arrived at a state proper for being exposed to the more open air, they are thrown out from the body of the caterpillar surrounded only with their membranes ; and as soon as they are arrived after this at a proper degree of strength and solidity, they labour to break through these thinner coverings, and to appear in their proper and natural form. The time of their duration in this state of chrysalis is very uncertain, some remaining in it only a few days, others several months, and some almost a year in appearance. But there is a fallacy in this that many are not aware of. It is natural to think, that as soon as the creature has inclosed itself in its shell, be that of what matter it will, it undergoes its change into the chrysalis state. And this is the case with the generality : yet there are some which are eight or nine months in the shell before they become chrysalides ; so that their duration in the real chrysalis state is much shorter than it naturally appears to be. M. Reaumur carefully watched the auriculated caterpillar of the oak into its several changes, and particularly from its chrysalis, which is of this last kind, into the fly ; and has given an account of the method of this as an instance of the general course of nature in these operations.

The membranes which envelope the creature in this chrysalis state are at first tough and firm, and immediately touch the several parts of the inclosed animal ; but by degrees, as these parts harden, they become covered, some with hairs, and others with scales. These, as they continue to grow, by degrees fall off the several particular membranes which cover the parts.

Chrysalis.

Chrysalis, parts on which they are placed, to a greater distance, and by degrees loosen them from the limbs. This is one reason of those membranes drying and becoming brittle.

The middle of the upper part of the *CORCELET* is usually marked with a line which runs in a longitudinal direction; and this part is always more elevated than the rest, even in the conic kinds, which are no otherwise angular. This line is in some very bold and plain; in others, it is so faint as not to be distinguishable without glasses; but it is always in the midst of that line that the shell begins to open. The motion of the head of the butterfly backwards first occasions this crack; and a few repetitions of the same motions open it the whole length of the line.

The clearing itself, however, entirely, is a work of more time in this case, than is the passing of the chrysalis out of the body of the caterpillar. In that case there is a crack sufficiently large in the skin of the back, and the whole chrysalis being loose comes out at once. But in this case, every particular limb, and part of the body, has its separate case; and these are almost inconceivably thin and tender, yet it is necessary that every part be drawn out of them before it appear naked to the open air. As soon as all this is effected, and the animal is at full liberty, it either continues some time upon the remains of its covering, or creeps a little way distant from it, and there rests. The wings are what we principally admire in this creature. These are at this time so extremely folded up, and placed in so narrow a compass, that the creature seems to have none at all; but they by degrees expand and unfold themselves; and finally, in a quarter of an hour, or half an hour at the utmost, they appear at their full size, and in all their beauty. The manner of this sudden unfolding of the wings is this: the small figure they make when the creature first comes out of its membranes, does not prevent the observing that they are at that time considerably thick. This is owing to its being a large wing folded up in the nicest manner, and with folds so arranged as to be by no means sensible to the eye, for the wing is never seen to unfold; but, when observed in the most accurate manner, seems to grow under the eye to this extent. When the creature is first produced from the shell, it is every where moist and tender; even its wings have no strength or stiffness till they expand themselves; but they then dry by degrees, and, with the other parts, become rigid and firm. But if any accident prevents the wings from expanding at their proper time, that is, as soon as the creature is out of its shell, they never afterwards are able to extend themselves; but the creature continues to wear them in their contracted and wholly useless state; and very often, when the wings are in part extended before such an accident happens, it stops them in a partial extension, and the creature must be contented to pass its whole life with them in that manner.

M. Reaumur has proved, that heat and cold make great differences in the time of hatching the butterfly from its chrysalis state: and this he particularly tried with great accuracy and attention, by putting them in vessels in warm rooms, and in ice-houses; and it seemed wholly owing to the hastening or retarding the eva-

poration of the abundant humidity of the animal in the chrysalis state, that it sooner or later appeared in the butterfly form. He varnished over some chrysalises, in order to try what would be the effect of thus wholly preventing their transpiration; and the consequence was, that the butterfly came forth from these two months later than their natural time. Thus was the duration of the animal in this state lengthened; that is, its existence was lengthened; but without any advantage to the creature, since it was in the time of its state of inaction, and probably of insensibility.

Though this was of no consequence, Mr Reaumur deduces a hint from it that seems to be of some use. He observes that hen's eggs, of which we make so many uses, and eat in so many forms, are properly a sort of chrysalis of the animal; their germ, after they are impregnated by the cock, containing the young animal alive, and waiting only a due degree of warmth to be hatched, and appear in its proper form. Eggs transpire notwithstanding the hardness of their shells; and when they have been long kept, there is a road found near one of their ends, between the shell and the internal membrane; this is a mark of their being stale, and is the effect of an evaporation of part of their humidity: and the same varnish which had been used to the chrysalis, being tried on eggs, was found to preserve them for two years, as fresh as if laid but the same day, and such as the nicest palate could not distinguish from those that were so. See EGGS.

It is not yet known how much further this useful speculation might be carried, and whether it might not be of great use even to human life, to invent something that should act in the manner of this varnish, by being rubbed over the body, as the *athleta* did of old, and the savages of the West Indies do at this time, without knowing why. But to return to the insects which are the subjects of this article; their third state, that in which they are winged, is always very short, and seems destined for no other action but the propagation of the species. See PAPILIO.

CHRYSANTHEMUM, CORN-MARIGOLD; a genus of the polygamia superflua order, belonging to the syngenesia class of plants. There are 19 species, of which the following are the most remarkable: 1. The ferotinum is a native of North America. The roots of this plant creep far under the surface, and send up strong stalks more than four feet high, garnished with long sawed leaves ending in points. These stalks divide upward into many smaller; each being terminated by a large, white, radiated flower, which appears in the end of August or September. 2. The coronarium hath been long cultivated in the gardens on account of the beauty of its flowers. It grows to the height of three feet, with a single upright stalk divided into numerous branches, garnished with pinated leaves, and crowned with elegant compound flowers of different colours and properties. The varieties are, single and double flowers of a cream colour; yellow; yellow and white; brimstone-coloured; fiftular, or quilled; or those with finely jagged leaves, and flowers of all the above colours and properties. All the varieties begin flowering in July: the flowers are exceedingly numerous, and exhibit a constant succession of full bloom till November; and both single and

Chrysalis
|
Chrysanthemum.

Chrysanthemum
Chryso-
balanus.

and double are succeeded by abundance of seed. 3. The puticifens is a native of the Canary Islands. It rises with a shrubby stalk near two feet high, dividing into many branches, which are garnished with pretty thick succulent leaves, of a greyish colour, cut into many segments. The flowers come out from the wings of the leaves, growing upon naked foot-stalks singly, which greatly resemble those of chamomile. There is a succession of flowers on the same plant for the greatest part of the year, for which it is chiefly esteemed. This plant will perfect seeds in Britain when the seasons are favourable.

Culture. The first kind multiplies very fast by its creeping roots, and will thrive in any soil or situation. The second may be raised in abundance from seed, either in a hot-bed or warm border, in the spring, for transplanting; also by cuttings and slips of their branches in autumn. The latter method is practised only for the propagation of the fine doubles, for an early bloom the following summer; and the best time to perform it is in September, or early in October. Cut off, at that time, a quantity of the robust side shoots, from three to six inches long, without flowers; divest them of the lower leaves, and plant many of them together in large pots, within an inch or two of their tops, and two or three inches apart; give some water, and place them in the shade during the hot weather: by the end of October they will be rooted, when the pots are to be removed either into a green-house or garden-frame, for the winter; but the latter is the most eligible, where they may enjoy the full air in mild weather, and have occasional shelter from frost. In April they may be transplanted singly into borders, and some in pots. The plants thus raised will flower a month or six weeks sooner the succeeding summer than those raised in the spring from seed; but as they soon become barren, it is proper to have always a quantity of plants raised from the seed. The third sort may be raised either from seeds or cuttings, but requires to be sheltered in the green-house in winter.

CHRYSIPPUS, a Stoic philosopher, born at Solos in Cilicia, was disciple to Cleanthes, Zeno's successor. He wrote many books, several of which related to logic. None of the philosophers spoke in stronger terms of the fatal necessity of every thing, nor more pompously of the liberty of man, than the Stoics, Chrysippus in particular. He was so considerable among them, as to establish it into a proverb, that if it had not been for Chrysippus, the porch had never been. Yet the Stoics complained, as Cicero relates, that he had collected so many arguments in favour of the sceptical hypothesis, that he could not answer them himself; and thus had furnished Carneades, their antagonist, with weapons against them. There is an apophthegm of this philosopher preserved, which does him honour. Being told that some persons spoke ill of him, "It is no matter," (said he), "I will live so that they shall not be believed."

CHRYSOBALANUS, COCOA PLUM; a genus of the monogynia order, belonging to the icofandria class of plants. There is only one species, the icaco, which is a native of the Bahama islands, and many other parts of America, but commonly grows near the sea. It rises with a shrubby stalk eight or nine feet high,

sending out several side-branches, which are covered with a dark brown bark. The flowers are white, and are succeeded by plums like damsons; some blue, some red, and others yellow. The stone is shaped like a pear, and has five longitudinal ridges. They are propagated by seeds, which must be procured from the places where they grow naturally. The management is the same as in other tender plants which are natives of those climates.

CHRYSOCOLLA, the Greek name for BORAX.

CHRYSOCOMA, GOLDY-LOCKS; a genus of the polygamia æqualis order, belonging to the lyngensia class of plants. There are nine species, the most remarkable of which are, the linofyris, the coma aurea, and the cornua. These are herbaceous flowering perennials growing from one to two feet high, ornamented with narrow leaves, and compound floscular flowers of a yellow colour. They are easily propagated by dividing the roots or cuttings; but the two last require to be sheltered in the green-house in winter.

CHRYSOLARAS (Emanuel), one of those learned men in the 14th century, who brought the Greek literature into the west. He was a man of rank; and descended from an ancient family, said to have removed with Constantine from Rome to Byzantium. He was sent into Europe by the emperor of the east to implore the assistance of the Christian princes. He afterwards taught at Florence, Venice, Pavia, and Rome; and died at Constantinople, in 1415, aged 47. He wrote a Greek grammar, and some other small pieces.

CHRYSLITE, the name given by the moderns to a gem, which was called the topaz by the ancients. All the modern jewellers, and those of several ages before them, have agreed in calling this gem the chrysolite: and the true chrysolite of the ancients, which had its name from its fine gold yellow colour, they now universally call the topaz.

The chrysolite of our times, the topaz of the ancients, is, even in its most pure and perfect state, a gem of but small beauty, and little value. It is found of various sizes, and some of the coarser pieces of it are vastly larger than those of any of the other gems are ever found to be: its most frequent size, however, when perfect, is about the size of a nutmeg. It is found of very various figures, but never columnar, or in the form of crystal: it is in some places found small, or in irregular pebble-like masses; in others, generally oblong and flattened; and is always of a rude surface, and less bright than any of the other gems. Its colour is a dead green, with a faint admixture of a pale yellow. It has these different tinges, in the several specimens, in different degrees of mixture; but its most usual colour is that of an unripe olive with somewhat of a brassy colour mixed with it; and sometimes it is of a pale and dusky green, obscured by a mixture of brown, and with a slight cast of the same brassy yellow. It is much softer than any of the pellucid gems; its finest pieces do not exceed crystal in hardness, and its coarser are greatly softer: it takes a good polish, however; and, in some of its finer specimens, makes a tolerable appearance, though greatly inferior to the other gems. Our jewellers take very

Chryso-
colla
Chrysolite.

Chrysolite
Chrysothorn

little notice of it; and instead of having two or three names for it, as they have for most of the other gems, they call it very often a *prafius*, and the less accurate among them often call the chryloprafius a *chryfolite*. This ftone is found in New Spain, and alfo in feveral parts of Europe, as in Silefia, Bohemia, &c. The American chryfolites, however, are greatly fuperior to the European; but they are ufually fmall: the Bohemian are large, but very few of them are of a good colour, or free from flaws.

CHRYsolITE-Pafte, a kind of glafs made in imitation of natural chryfolite, by mixing two ounces of prepared cryftal with ten ounces of red-lead, adding twelve grains of crocus martis made with vinegar; and then baking the whole for twenty-four hours, or longer, in a well luted cucurbit.

CHRYsOMELA, in zoology, a genus of infefts, belonging to the order of coleoptera. The antennæ are fhaped like bracelets, and thicker on the outfide; and neither the breaft nor the elytra are margined. There are no lefs than 122 fpecies enumerated by Linnaeus, principally diftinguifhed by differences in their colour.

CHRYsOPHYLLUM, or **BULLY-TREE**, a genus of the monogynia order, belonging to the pentandria clafs of plants. There are two fpecies, the camito and glabrum, both natives of the Weft Indies. The firft rifes 30 or 40 feet high, with a large trunk covered with a brown bark, and divides into many flexible flender branches, which generally hang downward, garnifhed with fpear-fhaped leaves, whole under fides are of a bright ruftlet colour. The flowers come out at the extremities of the branches, difpofed in oblong bunches, which are fucceeded by fruit of the fize of a golden pippin, that are very rough to the palate, and aftringent; but when kept fome time mellow, as is praftifed here with medlars, they have an agreeable flavour. The fecond fort never rifes to the height of the firft, nor do the trunks grow to half the fize; but the branches are flender and garnifhed with leaves like thofe of the firft. The flowers come out in clufters from the fide of the branches, which are fucceeded by oval fmoth fruit about the fize of olives, inclofing three or four hard compreffed feeds. Both thefe plants are frequently preferred in gardens where there are large ftoves, and are propagated by feeds, but the plants can never bear the open air in this country.

CHRYsOPRASUS, or **CHRYsOPRASius**, the tenth of the precious ftones, mentioned in the Revelations, as forming the foundation of the heavenly Jerufalem. The chryloprafius is a fpecies of prafius, of a pale, but pure green colour, with an admixture of yellow.

CHRYsOSTOM (St John), a celebrated patriarch of Conftantinople, and one of the moft admired fathers of the Chriftian church, was born of a noble family at Antioch, about the year 347. He ftudied rhetoric under Libavius, and philofophy under Andragathus: after which he fpent fome time in folitude in the mountains near Antioch; but the aufterities he endured, having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius Flavian, Meletius's fucceffor, raifed him to the office

of prefbyter five years after; when he diftinguifhed himfelf fo greatly by his eloquence, that he obtained the furname of *Golden Mouth*. Neftarius patriarch of Conftantinople, dying in 397, St Chryfoftom, whole fame was fpread throughout the whole empire, was chofen in his room by the unanimous confent of both the clergy and the people. The emperor Arcadius confirmed this election, and caufed him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained bifhop on the 26th of February, 398; when he obtained an order from the emperor againft the Eunomians and Montanifts; reformed the abufes which fubfifted againft his clergy; retrenched a great part of the expences in which his predeceffors had lived, in order to enable him to feed the poor and build hofpitals; and preached with the utmoft zeal againft the pride, luxury, and avarice of the great. But his pious liberty of fpeech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him depofed and banifhed; but he was foon recalled. After this, declaiming againft the dedication of a ftatue erected to the emperrefs, fhe banifhed him into Cucufus in Armenia, a moft barren, inhofpitable place; afterwards, as they were removing him from Petyus, the foldiers treated him fo roughly, that he died by the way, *A. D.* 407. The beft edition of his works is that published at Paris in 1718, by Montfaucon.

CHRYSTAL. See **CRYSTAL**.

CHUB, or **CHUBB**, in ichthyology. See **CYPRINUS**.

CHUBB (Thomas), a noted polemical writer, born at Eaft Harnham, a village near Salisbury, in 1679. He was put apprentice to a glover at Salisbury, and afterwards entered into partnership with a tallow-chandler. Being a man of ftrong natural parts, he employed all his leifure in reading; and though a ftranger to the learned languages, became tolerably verfed in geography, mathematics, and other branches of fcience. His favourite ftudy was divinity; and he formed a little fociety for the purpofe of debating upon religious fubjects, about the time that the Trinitarian controverfy was fo warmly agitated between Clarke and Waterland. This fubject therefore falling under the cognizance of Chubb's theological afsembly, he at their request drew up and arranged his fentiments on it, in a kind of differtation; which was afterward published under the title of *The Supremacy of the Father asserted*, &c. In this piece Mr Chubb fhewed great talents in reafoning; and acquired fo much reputation, that the late Sir Jofeph Jekyl, mafter of the rolls, took him into his family to enjoy his converfation: but though he is faid to have been tempted to remain with him by the offer of a gentle allowance, he did not continue with him many years; but chofe to return to his friends at Salisbury. He published afterward a 4^{to} volume of trafts, which Mr Pope informs his friend Gay, he "read through with admiration of the writer, though not always with approbation of his doctrine." He died a fingle man in the 68th year of his age, and left behind him 2 vols. of pofthumous trafts, in which he appears to have had little or no belief in revelation. But however licentious his way of thinking may be deemed, nothing irregular

Chryfal
Chubb.

Chudleigh
Church.

irregular or immoral has been fairly imputed to him in his life and actions.

CHUDLEIGH (Lady Mary), was born in 1656, and married to Sir George Chudleigh, bart. by whom she had several children : her poems and essays have been much admired for delicacy of style. She died in 1710 ; and is said to have written several dramatic pieces, which, though not printed, are preserved in the family.

CHUPMESSAHITES, a sect among the Mahomans, who believe that Jesus Christ is God, and the true Messiah, the Redeemer of the world ; but without rendering him any public or declared worship. The word, in the Turkish language, signifies *protector of the Christians*. Ricaut says, there are abundance of these *Chupmessahites* among the people of fashion in Turkey, and some even in the seraglio.

CHURCH, has different significations, according to the different subjects to which it is applied.

1. It is understood of the collective body of Christians, or all those over the face of the whole earth who profess to believe in Christ, and acknowledge him to be the Saviour of mankind. This is what the ancient writers call the catholic or universal church. Sometimes the word church is considered in a more extensive sense, and divided into several branches ; as the church militant, is the assembly of the faithful on earth ; the church triumphant, that of the faithful already in glory ; to which the Papists add the church patient, which, according to their doctrines, is that of the faithful in purgatory.

2. Church is applied to any particular congregation of Christians, who associate together and concur in the participation of all the institutions of Jesus Christ, with their proper pastors and ministers. Thus we read of the church of Antioch, the church of Alexandria, the church of Thessalonica, and the like.

3. Church denotes a particular sect of Christians distinguished by particular doctrines and ceremonies. In this sense, we speak of the Romish church, the Greek church, the Reformed church, the church of England, &c.

The Latin or Western church, comprehends all the churches of Italy, France, Spain, Africa, the north, and all other countries whither the Romans carried their language. Great Britain, part of the Netherlands, of Germany, and of the North, have been separated from hence ever since the time of Henry VIII. ; and constitute what we call the Reformed church, and what the Romanists call the Western schism.

The Greek or Eastern church, comprehends the churches of all the countries anciently subject to the Greek or eastern empire, and through which their language was carried ; that is, all the space extended from Greece to Mesopotamia and Persia, and thence into Egypt. This church has been divided from the Roman, ever since the time of the emperor Phocas.

The Gallican church, denotes the church of France, under the government and direction of their respective bishops and pastors. This church has always enjoyed certain franchises and immunities ; not as grants from popes, but as derived to her from her first original, and which she has taken care never to relinquish. These liberties depend upon two maxims ; the first,

that the pope has no authority or right to command or order any thing either in general, or in particular, in which the temporalities and civil rights of the kingdom are concerned ; the second, that notwithstanding the pope's supremacy is owned in cases purely spiritual, yet in France his power is limited and regulated by the decrees and canons of ancient councils received in that realm.

4. The word church is used to signify the body of ecclesiastics, or the clergy, in contradistinction to the laity. See **CLERGY**.

5. Church is used for the place where a particular congregation or society of Christians assemble for the celebration of divine service. In this sense churches are variously denominated, according to the rank, degree, discipline, &c. as Metropolitan church, Patriarchal church, Cathedral church, Parochial church, Collegiate church, &c. See **METROPOLIS**, **PATRIARCH**, &c.

CHURCH-ALS. See **WHITSUN-ALS**.

CHURCH-REEVES, the same with **CHURCH-WARDENS**.

CHURCH-SCOT, or **CHURCHESSET**, a payment, or contribution, by the Latin writers frequently called *primitiæ fœminum* ; being, at first, a certain measure of wheat, paid to the priest on St Martin's day, as the first-fruits of harvest. This was enjoined by the laws of king Malcolm IV. and Canute, c. 10. But after this, *Church-scot* came to signify a reserve of corn not paid to the secular priests, or to the religious ; and sometimes was taken in so general a sense as to include poultry, or any other provision that was paid in kind to the religious. See **TITHES**.

CHURCH-WARDENS, (ecclesiæ guardiani), in the English ecclesiastical polity, are the guardians or keepers of the church, and representatives of the body of the parish. They are sometimes appointed by the minister, sometimes by the parish, sometimes by both together, as custom directs. They are taken, in favour of the church, to be, for some purposes, a kind of corporation at the common law ; that is, they are enabled, by that name, to have a property in goods and chattels, and to bring actions for them, for the use and profit of the parish. Yet they may not waste the church goods, but may be removed by the parish, and then called to account by actions at common law : but there is no method of calling them to account but by first removing them ; for none can legally do it but those who are put in their place. As to lands, or other real property, as the church, church-yard, &c. they have no sort of interest therein ; but if any damage is done thereto, the parson only or vicar shall have the action. Their office also is to repair the church, and make rates and levies for that purpose : but these are recoverable only in the ecclesiastical courts. They are also joined with the overseers in the care and maintenance of the poor. They are to levy a shilling forfeiture on all such as do not repair to church on Sundays and holidays ; and are empowered to keep all persons orderly while there ; to which end it has been held that a church-warden may justify the pulling off a man's hat, without being guilty of either an assault or a trespass. There are also a multitude of other petty parochial powers committed to their charge by divers acts of Parliament.

CHURCH-YARD, a piece of ground adjoining to a church,

Churchill. church, set apart for interment or burial of the dead. —In the church of Rome they are blessed or consecrated with great solemnity. If a church-yard which has been thus consecrated, shall afterwards be polluted by any indecent action, or profaned by the burial of an infidel, an heretic, an excommunicated or unbaptized person, it must be *reconciled*; and the ceremony of the reconciliation is performed with the same solemnity as that of the blessing or consecration.

CHURCHILL (Sir Winston) the father of the great duke of Marlborough, was descended from an ancient and honourable family in Dorsetshire. He was born at Wotton Glanville in that county, in 1610; and educated at St John's college at Oxford. He engaged in the cause of his unfortunate sovereign Charles I. for which he suffered severely in his fortune; and having married, while young, Elizabeth, the daughter of Sir John Drake of Ash in Devonshire, he was forced to seek a refuge in her father's house, when Mr Churchill's misfortunes left him none that he could call his own; and there most of his children were born. After the restoration, he was elected a burgess to serve in parliament for the borough of Weymouth; and, in 1669, his majesty was pleased to confer on him the honour of knighthood. The next year he was made one of the commissioners of claims in Ireland; and upon his return from thence, was constituted one of the clerks controllers of the green-cloth: but writing a kind of political essay upon the History of England, which gave great offence to the parliament, he was, in 1678, dismissed from his post. He was, however, soon restored to it again; and lived to see his eldest surviving son raised to the peerage, and the rest of his children in a fair way to promotion. He died in 1688.

CHURCHILL (John) duke of Marlborough, and prince of the holy Roman empire; a most renowned general and statesman, was born at Ash in Devonshire in 1650. He was eldest son of Sir Winston Churchill*, who carried him to court while very young, and where he was particularly favoured by James duke of York, afterwards king James II. when only twelve years of age. In 1666, he was made an ensign of the guards during the first Dutch war; and afterwards improved himself greatly in the military art at Tangier. In 1672, Mr Churchill attended the duke of Monmouth who commanded a body of auxiliaries in the French service, and was soon after made a captain in the duke's own regiment. At the siege of Nimeguen, which happened in that campaign, he distinguished himself so much that he was taken notice of by the celebrated marshal Turenne, who bestowed on him the name of the *handsome Englishman*.—In 1673, he was at the siege of Maelbricht, where he gained such applause, that the king of France made him a public acknowledgement of his service; and the duke of Monmouth, who had the direction of the attack, told king Charles II. that he owed his life to Mr Churchill's bravery. In 1681, he married Sarah daughter and co-heiress (with her sister the countess of Tyrconnel) of Richard Jennings Esq; of Sandrich, in Hertfordshire. The duke of York recommended him in a very particular manner to the king; who, in 1682, created him baron of Eymouth in the county of Berwick in Scotland, and made him colonel of the third troop of

guards. A little after king James's accession, he was created baron Churchill of Sandrich in the county of Hertford, and made brigadier-general of his majesty's army in the west; where, when the duke of Monmouth came to surprise the king's army, while the earl of Feversham and the majority of the officers were in their beds, he kept the enemy in play, till the king's forces had formed themselves, and thereby saved the whole army. When James shewed an intention of establishing the catholic religion in Britain, lord Churchill, notwithstanding the great obligations he owed him, thought it his duty to abandon the royal cause; but even then did not leave him without acquainting him by letter with the reason of his doing.—Lord Churchill was graciously received by the prince of Orange; and was by him employed first to re-assemble the troop of guards at London; and afterwards to reduce some lately raised regiments, and to new-model the army: for which purpose he was invested with the rank and title of lieutenant-general. In 1689, he was sworn one of the privy council, and one of the gentlemen of the king's bed-chamber; and on the 9th of April following, was raised to the dignity of earl of Marlborough in the county of Wilts. He assisted at the coronation of their majesties; and was soon after made commander in chief of the English forces sent over to Holland; and here he first laid the foundation of that fame which was afterwards spread over all Europe. In 1690, he was made general of the forces sent to Ireland; where he made the strong garrisons of Cork and Kinsale prisoners of war. The year following, king William shewed the good opinion he had of his conduct, by sending him to Flanders to put all things in readiness, and to draw the army together against his arrival. In 1692, he was dismissed from all his employments; and, not long after, was with some other peers committed to the tower on an accusation of high treason; which, however, was afterwards found to be a false and malicious report, the authors of which were punished. Marlborough was soon restored to favour, and in 1698, was appointed governor to the earl of Gloucester; with this extraordinary compliment from king William, "My lord, make him but what you are, and my nephew will be all I wish to see him." The same day he was again sworn one of the privy council; and in July following was declared one of the lords justices of England, for the administration of the government, in which great trust he was three times successively in the king's absence, who in 1701 appointed him general of the foot, commander in chief of the English forces, and ambassador extraordinary and plenipotentiary at the Hague. Upon the accession of queen Anne to the throne, he was elected into the order of the garter, declared captain-general of all her majesty's forces, and sent ambassador extraordinary and plenipotentiary to Holland. After several conferences about a war, he put himself at the head of the army, where all the other generals had orders to obey him. His exploits in the field have been taken notice of under the article BRITAIN, n^o 348 —366: we shall therefore only take notice in this place, of the rewards and honours conferred upon him for these exploits. After his first campaign he was created marquis of Blandford and duke of Marl-

borough,

* See the foregoing article.

Churchill. borough, with a pension of L. 5000 for life, out of the post-office. In 1703, he met Charles III. late emperor going to Spain, who presented him with a sword set with diamonds. In 1704, having forced the enemy's lines at Schellenberg, he received a letter of thanks from the emperor Leopold, written with his own hand, an honour seldom done to any but sovereign princes. After the battle of Blenheim, he received congratulatory letters from most of the potentates in Europe, particularly from the States General, and from the emperor, who desired him to accept of the dignity of a prince of the empire, which with the queen's leave was conferred upon him by the title of "Prince of Mildenheim in the province of Swabia." After the campaign was ended, he visited the court of Prussia, where he laid such schemes as suspended the disputes with the Dutch about king William's estate, which wife conduct caused the whole confederacy to acknowledge that he had done the greatest service possible to the common cause. Upon his return to England, the queen, to perpetuate his memory, granted the interest of the crown in the honour and manor of Woodstock and hundred of Wotton to him and his heirs for ever. In 1705, he made a tour to Vienna, upon an invitation of the emperor Joseph; who highly caressed him, and made him a grant of the lordship of Mildenheim. After the campaign of 1708, the speaker of the house of commons was sent to Brussels on purpose to compliment him; and on his return to England he was again complimented in the house of lords by lord chancellor Cowper. All his services, however, and all the honours conferred upon him, were not sufficient to preserve him from being disgraced. After the change of the ministry in 1710, his interest daily declined; and in 1712, on the first day of the new year, he was removed from all his places. Finding all arts used to render him obnoxious in his native country, he visited his principality of Mildenheim, and several towns in Germany; after which he returned to England, and arrived there on the day of the queen's death. After being welcomed by the nobility and foreign ministers, he attended on king George I. in his public entry through London, who appointed him captain-general, colonel of the first regiment of foot-guards, one of the commissioners for the government of Chelsea hospital, and master-general of the ordnance. Some years before his death, he retired from public business. He died at Windsor lodge in 1722, aged 72; and was buried with great pomp in king Henry VIIth's chapel in Westminster Abbey.

CHURCHILL (Charles), a celebrated satirist, the son of Mr Charles Churchill, curate and lecturer of St John's, Westminster, was educated at Westminster school, and received some applause for his abilities from his tutors in that famous seminary. His capacity, however, was greater than his application, so that he acquired the character of a boy that could do good if he would. As the slightest accounts of persons so noted are agreeable, it may not be amiss to observe, that having one day got an exercise to make, and from idleness or inattention having failed to bring it at the time appointed, his master thought proper to chastise him with some severity, and even reproached his stupidity: what the fear of stripes could not effect,

the fear of shame soon produced, and he brought his exercise the next day, finished in such a manner, that he received the public thanks of all the masters. Still, however, his progress in the learned languages was but slow; nor is it to be wondered at, if we consider how difficult it was for a strong imagination, such as he was possessed of, to conform and walk tamely forward in the trammels of a school education: minds like his are ever starting aside after new pursuits; desirous of embracing a multiplicity of amusing objects; eager to come at the end, without the painful investigation of the means. In short, for want of proper skill in these languages, he was rejected from Oxford, whither his father had sent him; and probably this might have given occasion to the frequent invectives we find in his works against that most respectable university. Upon his return from thence, he again applied to his studies in Westminster school, where, at 17 years of age, he contracted an intimacy with a lady, to whom he was married, and their mutual regard for each other continued for several years. At the usual age of going into orders, Mr Churchill was ordained by the late bishop of London, and obtained a small curacy in Wales of thirty pounds a year. Thither he carried his wife; they took a small house; and he passed through the duties of his station with assiduity and cheerfulness. Happy had it been for him had he continued there to enjoy the fruits of piety, peace, and simplicity of manners. He was beloved and esteemed by his parishioners; and though his sermons were rather above the level of his audience, they were commended and followed. But endeavouring to advance his fortune, by keeping a cyder cellar, it involved him in difficulties which obliged him to leave Wales and come to London. His father dying soon after, he stepped into the church in which he had officiated; and, in order to improve his income, which scarcely produced an hundred pounds a year, he taught young ladies to read and write English at a boarding-school, kept by Mrs Dennis, where he behaved with that decency and decorum which became his profession. His method of living, however, bearing no proportion to his income, he contracted several debts in the city; which being unable to pay, a jail, the terror of indigent genius, seemed ready to complete his misfortunes: but from this state of wretchedness he was relieved by the benevolence of Mr Lloyd, father to the poet of that name. Mean while, Mr Lloyd, the son, wrote a poetical epistle called the *Altor*; which being read and approved by the public, gave the author a distinguished place among the writers of his age. This induced Mr Churchill to write the *Rosciad*. It first came out without the author's name; but the justness of the remarks, and the severity of the satire, soon excited public curiosity. Though he never disowned his having written this piece, and even openly gloried in it; yet the public, unwilling to give so much merit to one alone, ascribed it to a combination of wits: nor were Messrs Lloyd, Thornton, or Colman, left unnamed upon this occasion. This misplaced praise soon induced Mr Churchill to throw off the mask, and the second edition appeared with his name at full length. As the *Rosciad* was the first of this poet's performances,

Churchill.

Churchill.

performances, so many are of opinion that it is the best. In it we find a very close and minute discussion of the particular merit of each performer; their defects pointed out with candour, and their merits praised without adulation. This poem, however, seems to be one of those few works which are injured by succeeding editions: when he became popular, his judgment began to grow drunk with applause; and we find, in the latter editions, men blamed whose merit is incontestible, and others praised that were at that time in no degree of esteem with the judicious.

His next performance was his *Apology to the Critical Reviewers*. This work is not without its peculiar merit; and as it was written against a set of critics whom the world was willing enough to blame, the public read it with their usual indulgence. In this performance, he shewed a particular happiness of throwing his thoughts, if we may so express it, into poetical paragraphs; so that the sentence swells to the break or conclusion, as we find in prose.

But while his writings amused the town, his actions disgusted it. He now quitted his wife with whom he had cohabited many years; and resigning his gown and all clerical functions, commenced a complete *man of the town*, got drunk, frequented stewes; and, giddy with false praise, thought his talents a sufficient atonement for all his follies. In some measure to palliate the absurdities of his conduct, he now undertook a poem called *Night*, written upon a general subject indeed, but upon false principles; namely, that whatever our follies are, we should never attempt to conceal them. This, and Mr Churchill's other poems, being shown to Mr Johnson, and his opinion being asked, he allowed them but little merit; which being told to the author, he resolved to requite this private opinion with a public one. In his next poem, therefore, of the *Ghost*, he has drawn this gentleman under the character of Pomposo; and those who disliked Mr Johnson, allowed it to have merit. Mr Johnson's only reply to Churchill's abuse was, "that he thought him a shallow fellow in the beginning, and could say nothing worse of him still." The poems of *Night* and the *Ghost* had not the rapid sale the author expected; but his prophecy of *Famine* soon made ample amends for the late paroxysm in his fame. In this piece, written in the spirit of the famous North Briton, he exerted his virulent pen against the whole Scots nation; adopting the prejudices of the mob, and dignifying scurrility by the aid of a poetic imagination. It had a rapid and extensive sale, as prophesied by Mr Wilkes; who said, before its publication, that he was sure it must take, as it was at once personal, poetical, and political. After its appearance, it was even asserted by his admirers, that Mr Churchill was a better poet than Pope. This exaggerated adulation, as it had before corrupted his morals, began now to impair his mind: several succeeding pieces were published, which, being written without effort, are read without pleasure. His *Gothom*, *Independence*, *The Times*, seem merely to have been written by a man who desired to avail himself of the avidity of the public curiosity in his favour, and are rather aimed at the pockets than the hearts of his readers.

Church-
yard
Cibber.

Mr Churchill died in 1764, of a miliary fever, with which he was seized at Boulogne in France, whither he had gone on a visit to Mr Wilkes. After his death his poems were collected and printed together in two volumes 8vo.

CHURCHYARD (Thomas), a poet who flourished in the reigns of Henry VIII. Edward VI. queen Mary and queen Elizabeth, was born at Shrewsbury; and inherited a fortune, which he soon exhausted in a fruitless attendance on the court, by which he only gained the favour of being retained a domestic in the family of lord Surrey; when, by his lordship's encouragement, he commenced poet. Upon his patron's death, he betook himself to arms; was in many engagements; was frequently wounded, and was twice made prisoner. He published 12 pieces, which he afterwards printed together in one volume, under the title of *Churchyard's Chips*; and also the tragedy of Thomas Mowbray duke of Norfolk. He died in 1570.

CHYLE, in the animal oeconomy, a milky fluid secreted from the aliments by means of digestion. See ANATOMY, n° 366,—371.

CHYLIFICATION, the formation of the chyle, or the act whereby the food is changed into chyle.

The chyle has by some authors been thought to have a great resemblance in its nature and chemical analysis to milk. The subject however, hath as yet, been but little inquiry into. See the article MILK.

CHYME, or CHYMUS, in the common signification of the word, denotes every kind of humour which is incrassated by concoction; under which notion it comprehends all the humours fit or unfit for preserving and nourishing the body, whether good or bad. It frequently imports the finest part of the chyle, when separated from the faeces, and contained in the lacteal and thoracic duct.

CHYMISTRY. See CHEMISTRY.

CHYMOLOGY, an appellation given to such naturalists as have employed their time in investigating the properties of plants from their taste and smell.

CHYMOSIS, in medicine, the act of making or preparing CHYME.

CHYMOSIS is also a distortion of the eye-lids, arising from an inflammation; also an inflammation of the tunica cornea in the eye.

CIBBER (Colley), a celebrated comedian, dramatic writer, and poet laureat to the king, was born at London in 1671. His father Caius Gabriel Cibber, was a native of Holstein, and a skilful statuary, who executed the basso relievo on the pedestal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlehem Hospital in Moorfields. Colley, who derived his Christian name from the surname of his mother's family, was intended for the church, but betook himself to the stage, for which he conceived an early inclination; and he was some time before he acquired any degree of notice, or even a competent salary. His first essay in writing, was the comedy of *Love's last Shift*, acted in 1695, which met with success; as did his own performance of the character of the fop in it. From that time, as he says himself, "My muse and my spouse were so equally prolific, that the one was seldom the mother of a child, but in the same year the other made
me

me the father of a play. I think we had a dozen of each sort between us; of both which kinds some died in their infancy, and near an equal number of each were alive when we quitted the theatre." The *Carleſs Huſband*, acted in 1704, met with much applauſe, and is reckoned his beſt play: but none was of more importance to him than the *Non-juror*, acted in 1717, and levelled againſt the Jacobites. This laid the foundation of the miſunderſtanding between him and Mr Pope, raiſed him to be the hero of the *Dunciad*, and made him poet laureat in 1730. He then quitted the ſtage, except a few occaſional performances; and died in 1757. Cibber neither ſucceeded in acting nor in writing tragedy; and his odes were not thought to partake of the genius or ſpirit he ſhewed in his comedies.

His ſon *Theophilus*, alſo a comic actor after him, was born during a great ſtorm in 1703; and after paſſing a life of extravagance, diſtreſs, and perplexity, perished in another ſtorm in 1757, in the paſſage between Dublin and England. *Theophilus* married the ſiſter of Thomas Auguſtin Arne, the famous muſical compoſer; who became a celebrated tragic actorſs, and whoſe honour was ſacrificed to her huſband's extravagance.

CIBDELOPLACIA, in natural hiſtory, a genus of ſpars deſtroyed by a very large admixture of earth: they are opaque, formed of thin cruſts, covering vegetables and other bodies, by way of incruſtations.

Of this genus we have the following ſpecies: 1. A greyiſh-white one, with a rough ſurface. 2. A whitish-brown one: both theſe are friable. 3. A hard, pale-brown kind, which is the *offecolla* of the ſhops. 4. The whitish-grey kind, with a ſmooth ſurface: this is the *unicornu foſſile* and *ceratites* of authors. 5. The whitish-ſhiny *coralloide* kind.

CIBDELOSTRACIA, in natural hiſtory, terrene ſpars, deſtitute of all brightneſs and tranſparency, formed into thin plates, and uſually found coating over the ſides of hiſſures, and other cavities of ſtones, with congeries of them of great extent, and of plain or botryoid ſurfaces.

Of theſe there are uſually reckoned ſeven kinds: the firſt is the hard, browniſh-white *cibdeloſtracium*, found in Germany: the ſecond is the hard, whitish *cibdeloſtracium*, with thin cruſts, and a ſmoother ſurface, found alſo in the Harts-foreſt in Germany: the third is the hard, pale-brown *cibdeloſtracium*, with numerous very thin cruſts, found in ſubterranean caverns in many parts of England as well as Germany: the fourth is the white, light, and friable *cibdeloſtracium*, found alſo in Germany, but very rarely in any part of England: the fifth is the light, hard, pale-brown *cibdeloſtracium*, with a ſmooth ſurface, found in almoſt all parts of the world: the ſixth is the whitish, friable, cruſtaceous *cibdeloſtracium*, with a rougher ſurface, frequent in Germany and England; and the ſeventh is the browniſh-white, friable *cibdeloſtracium*, with a duſty ſurface, found in ſeveral parts of Ireland, as well as Germany.

CICADA, or **AMERICAN LOCUST**, in zoology, a genus of inſects belonging to the order of hemiptera. The beak is inflected; the antennæ are ſetaceous; the four wings are membranaceous and deſlected; and the feet, in moſt of the ſpecies, are of the jumping kind.

The ſpecies are fifty-one. The larvæ of ſeveral of this genus evacuate great quantities of a frothy matter upon the branches and leaves of plants, in the middle of which they conſtantly reſide. See *FROTH-SPIT*, and *CICADULA*.

CICADULA, in natural hiſtory, the name given by Mr Ray to a ſmall ſpecies of the above, called by Swammerdam *Ioculla pulex*, and found in May and June on the ſtalks and leaves of plants, involved in a ſpumeous white matter, commonly called cuckow-spit, or froth-spit. See *FROTH-SPIT*.

CICATRICULA, among natural hiſtorians, denotes a ſmall whitish ſpeck in the yolk of an egg, ſuppoſed to be the firſt rudiments of the future chick.

CICATRIX, in ſurgery, a little ſeam or elevation of callous fleſh riſing on the ſkin, and remaining there after the healing of a wound or ulcer. It is commonly called a ſcar.

CICATRIZANTS, in pharmacy, medicines which aſſiſt nature to form a cicatrix. Such are Armenian bole, powder of tutty, *deſiccativum rubrum*, &c.

Cicatrizants are otherwiſe called eſcharotics, epulotics, incarnatives, agglutinants, &c.

CICELY. See *MYRRHIS*.

CICER, or **CHICK-PEA**; a genus of the decandria order, belonging to the diadelphia claſs of plants. There is but one ſpecies, which produces peaſe ſhaped like the common ones, but much ſmaller. They are much cultivated in Spain, where they are natives, being one of the ingredients in their olios; as alſo in France; but are rarely known in Britain.

CICERO (Marcus Tullius,) the celebrated Roman orator, was born in the year of Rome 647, about 107 years before Chriſt. His father Marcus Tullius, who was of the equeſtrian order, took great care of his education, which was directed particularly with a view to the bar. Young Tully, at his firſt appearance in public, declaimed with ſuch vehemence againſt Sylla's party, that it became expedient for him to retire into Greece; where he heard the Athenian orators and philoſophers, and greatly improved both in eloquence and knowledge. Here he met with M. Pomponius who had been his ſchool-fellow; and who, from his love to Athens, and ſpending a great part of his days in it, obtained the ſurname of *Atticus*; and here they revived and confirmed that noted frienſhip which ſubſiſted between them through life, with ſo celebrated a conſtancy and affection. From Athens he paſſed into Aſia; and after an excursion of two years came back again into Italy.

Cicero was now arrived at Rome; and, after one year more ſpent at the bar, obtained, in the next place, the dignity of queſtor. Among the cauſes which he pleaded before his queſtorſhip, was that of the famous comedian Roſcius, whom a ſingular merit in his art had recommended to the familiarity and frienſhip of the greateſt men in Rome. The queſtors were the general receivers or treaſurers of the republic, and were ſent annually into the provinces diſtributed to them, as they always were, by lot. The iſland of Sicily happened to fall to Cicero's ſhare; and that part of it, for it was conſiderable enough to be divided into two provinces, which was called *Lilybæum*. This office he received not as a gift, but a truſt; and

Cicero.

he acquitted himself so well in it, that he gained the love and admiration of all the Sicilians. Before he left Sicily, he made the tour of the island, to see every thing that was curious, and especially the city of Syracuse; where he discovered the tomb of Archimedes to the magistrates who were hewing him the curiosities of the place, but who, to his surprise, knew nothing of any such tomb.

We have no account of the precise time of Cicero's marriage with Terentia; but it is supposed to have been celebrated immediately after his return from his travels to Italy, when he was about 30 years old. He was now disengaged from his quaestorship in Sicily, by which first step in the legal gradation and ascent of public honours, he gained an immediate right to the senate, and an actual admission into it during life; and settled again in Rome, where he employed himself constantly in defending the persons and properties of its citizens, and was indeed a general patron. Five years were almost elapsed since Cicero's election to the quaestorship, which was the proper interval prescribed by law, before he could hold the next office of ædile; to which he was now, in his 37th year, elected by the unanimous suffrages of all the tribes, and preferably to all his competitors. After Cicero's election to the ædileship, but before his entrance upon the office, he undertook the famed prosecution of C. Verres, the late prætor of Sicily; who was charged with many flagrant acts of injustice, rapine, and cruelty, during his triennial government of that island. This was one of the most memorable transactions of his life; for which he was greatly and justly celebrated by antiquity, and for which he will, in all ages, be admired and esteemed by the friends of mankind. The result was, that, by his diligence and address, he so confounded Hortensius, though the reigning orator at the bar, and usually styled the *king of the forum*, that he had nothing to say for his client. Verres, despairing of all defence, submitted immediately, without expecting the sentence, to a voluntary exile; where he lived many years, forgotten and deserted by all his friends. He is said to have been relieved in this miserable situation by the generosity of Cicero; yet was proscribed and murdered after all by Mark Antony, for the sake of those fine statues and Corinthian vessels of which he had plundered the Sicilians.

After the usual interval of two years from the time of his being chosen ædile, Cicero offered himself a candidate for the prætorship; and, in three different assemblies convened for the choice of prætors, two of which were dissolved without effect, he was declared every time the first prætor by the suffrages of all the centuries. He was now in the career of his fortunes; and in sight, as it were, of the consulship, the grand object of his ambition: and therefore, when his prætorship was at an end, he would not accept any foreign province, the usual reward of that magistracy, and the chief fruit which the generality proposed for it. He had no particular love for money, nor genius for arms, so that those governments had no charms for him: the glory which he pursued was to shine in the eyes of the city, as the guardian of its laws; and to teach the magistrates how to execute, the citizens how to obey, them.

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Being now in his 43^d year, the proper age required by law, he declared himself a candidate for the consulship, along with six competitors, L. Sculpicius Galba, L. Sergius Catilina, C. Antonius, L. Calpurnius Longinus, Q. Cornificius, and C. Licinius Sacerdos. The two first were patricians; the two next plebeians, yet noble; the two last the sons of fathers who had first imported the public honours into their families: Cicero was the only *new man*, as he was called, among them, or one of equestrian rank. These were the competitors; and in this competition the practice of bribing was carried on as openly and as shamefully by Antonius and Catiline as it usually is at our elections in Britain. However, as the election approached, Cicero's interest appeared to be superior to that of all the candidates: for the nobles themselves, though always envious and desirous to depress him, yet out of regard to the dangers which threatened the city from many quarters, and seemed ready to burst out into a flame, began to think him the only man qualified to preserve the republic, and break the cabals of the desperate by the vigour and prudence of his administration. The method of choosing consuls was not by an open vote; but by a kind of ballot, or little tickets of wood distributed to the citizens, with the names of the several candidates inscribed upon each: but in Cicero's case the people were not content with this secret and silent way; but, before they came to any scrutiny, loudly and universally proclaimed Cicero the first consul: so that, as he himself says, "he was not chosen by the votes of particular citizens, but the common suffrage of the city; nor declared by the voice of the crier, but of the whole Roman people."

Cicero had no sooner entered upon his office, than he had occasion to exert himself against P. Servilius Rullus, one of the new tribunes, who had been alarming the senate with the promulgation of an Agrarian law; the purpose of which was to create a decemvirate, or ten commissioners, with absolute power for five years, over all the revenues of the republic, to distribute them at pleasure to the citizens, &c. These laws used to be greedily received by the populace, and were proposed therefore by factious magistrates as oft as they had any point to carry with the multitude against the public good; so that Cicero's first business was to quiet the apprehensions of the city, and to baffle, if possible, the intrigues of the tribune. Accordingly, in an artful and elegant speech from the rostra, he gave such a turn to the inclination of the people, that they rejected this law with as much eagerness as they had ever received one. But the grand affair of all, which constituted the glory of his consulship, and has transmitted his name with such lustre to posterity, was the skill he shewed, and the unwearied pains he took, in suppressing that horrid conspiracy which was formed by Catiline and his accomplices for the subversion of the commonwealth. For this great service he was honoured with the glorious title of *pater patriæ*, "the father of his country," which he retained for a long time after.

Cicero's administration was now at an end; but he had no sooner quitted his office, than he began to feel the weight of that envy which is the certain fruit of illustrious merit. He was now, therefore, the com-

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mon mark, not only of all the factions, against whom he had declared perpetual war, but of another party not less dangerous, the envious too : whose united spleen never left him from this moment till they had driven him out of that city which he had so lately preferred. Cicero, upon the expiration of his consulship, took care to send a particular account of his whole administration to Pompey, who was finishing the Mithridatic war in Asia ; in hopes to prevent any wrong impressions there from the calumnies of his enemies, and to draw from him some public declaration in praise of what he had been doing. But Pompey being informed by Metellus and Cæsar of the ill humour that was rising against Cicero in Rome, answered him with great coldness ; and instead of paying him any compliment, took no notice at all of what had passed in the affair of Catiline : upon which Cicero expostulates with him in a letter which is still extant.

About this time Cicero bought a house of M. Crassus on the Palatine-hill, adjoining to that in which he had always lived with his father, and which he is now supposed to have given up to his brother Quintus. The house cost him near £. 30,000, and seems to have been one of the noblest in Rome. It was built about 30 years before by the famous tribune M. Livius Drusus : on which occasion we are told, that when the architect promised to build it for him in such a manner that none of his neighbours should overlook him ; " But if you have any skill (replied Drusus) contrive it rather so that all the world may see what I am doing." The purchase of so expensive a house raised some censure on his vanity ; and especially as it was made with borrowed money. This circumstance he himself does not dissemble ; but says merrily upon it, that " he was now plunged so deeply in debt, as to be ready for a plot, only that the conspirators would not trust him."

The most remarkable event that happened in this year, which was the 45th of Cicero's life, was the pollution of the mysteries of the *bona dea* by P. Clodius ; which, by an unhappy train of consequences, involved Cicero in a great and unexpected calamity. Clodius, who had an intrigue with Cæsar's wife Pompeia, who, according to annual custom, was now celebrating in her house those awful sacrifices of the goddesses, to which no male creature ever was admitted ; and where every thing masculine was so scrupulously excluded, that even pictures of that sort were covered during the ceremony. It flattered Clodius's imagination greatly to gain access to his mistress in the midst of her holy ministry ; and with this view he dressed himself in a woman's habit, that by the benefit of his smooth face, and the introduction of one of the maids, he might pass without discovery : but by some mistake between him and his guide, he lost his way when he came within the house, and fell in unluckily among the other female servants. Here he was detected by his voice, and the servants alarmed the whole company by their shrieks, to the great amazement of the matrons, who threw a veil over their sacred mysteries, while Clodius found means to escape. The story was presently spread abroad, and raised a general scandal and horror throughout the

city. The whole defence which Clodius made, when, by order of the senate, he was brought to a trial, was to prove himself absent at the time of the fact ; for which purpose he produced two men to swear, that he was then at Interamna, about two or three days journey from the city. But Cicero, being called upon to give his testimony, deposed, that Clodius had been with him that very morning at his house in Rome. Irritated by this, Clodius formed a scheme of revenge. This was to get himself chosen tribune, and in that office to drive Cicero out of the city, by the publication of a law, which, by some stratagem or other, he hoped to obtrude upon the people. But as all patri-cians were incapable of the tribunate, by its original institution, so his first step was to make himself a plebeian, by the pretence of an adoption into a plebeian house, which could not yet be done without the suffrage of the people. The first triumvirate was now formed ; which was nothing else in reality but a traitorous conspiracy of three of the most powerful citizens of Rome, to extort from their country by violence what they could not obtain by law. Pompey's chief motive was to get his acts confirmed by Cæsar in his consulship, which was now coming on : Cæsar, by giving way to Pompey's glory, to advance his own ; and Crassus, to gain that ascendence by the authority of Pompey and Cæsar, which he could not sustain alone. Cicero might have made what terms he pleased with the triumvirate ; and been admitted even a partner of their power, and a fourth in their league : but he would not enter into any engagements with the three whose union he and all the friends of the republic abhorred. Clodius, in the mean time, had been pushing on the business of his adoption : which at last he effected ; and began soon after to threaten Cicero with all the terrors of his tribunate, to which he was now advanced without any opposition. Both Cæsar and Pompey secretly favoured his scheme : not that they intended to ruin Cicero, but only to keep him under the lash ; and if they could not draw him into their measures, or make him at least keep quiet, to let Clodius loose upon him. Cæsar, in particular, wanted to distress him so far as to force him to a dependence on himself : for which end, while he was privately encouraging Clodius to pursue him, he was proposing expedients to Cicero for his security. But though his fortunes seemed now to be in a tottering condition, and his enemies to gain ground daily upon him ; yet he was unwilling to owe the obligation of his safety to any man, far less to Cæsar, whose designs he always suspected, and whose schemes he never approved. This stiffness in Cicero so exasperated Cæsar, that he resolved immediately to assist Clodius with all his power to oppress him ; while Pompey was all the while giving him the strongest assurances that there was no danger, and that he would sooner be killed himself than suffer him to be hurt.

Clodius, in the mean time, was obliging the people with several new laws, contrived chiefly for their advantage ; the design of all which was only to introduce, with a better grace, the ground-plot of the play, the banishment of Cicero. In short, having caused a law to be enacted, importing, that any who had condemned a Roman citizen unheard should himself be

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banished, he soon after impeached Cicero upon it. It was in vain that this great man went up and down the city soliciting his cause in the habit of a suppliant, and attended by many of the first young noblemen whom he had taught the rules of eloquence; those powers of speaking which had so often been successful in defending the cause of others, seemed totally to forsake his own: he was banished by the votes of the people 400 miles from Italy; his houses were ordered to be demolished, and his goods set up to sale. It cannot be denied, that in this great calamity he did not behave himself with that firmness which might reasonably be expected from one who had borne so glorious a part in the republic; conscious of his integrity, and suffering in the cause of his country: for his letters are generally filled with such lamentable expressions of grief and despair, that his best friends, and even his wife, were forced sometimes to admonish him to rouse his courage, and remember his former character. Atticus was constantly putting him in mind of it; and sent him word of a report, that was brought to Rome by one of Cassius's freed-men, that his affliction had disordered his senses. He was now indeed attacked in his weakest part; the only place in which he was vulnerable. To have been as great in affliction as he was in prosperity, would have been a perfection not given to man: yet this very weakness flowed from a source which rendered him the more amiable in all the other parts of his life; and the same tenderness of disposition which made him love his friends, his children, and his country, more passionately than other men, made him feel the loss of them more sensibly. When he had been gone a little more than two months, a motion was made in the senate by one of the tribunes, who was his friend, to recall him, and repeal the laws of Clodius; to which the whole house readily agreed. Many objections, as may be easily imagined, were given to it by the Clodian faction; but this made the senate only more resolute to effect it. They passed a vote therefore, that no other business should be done till Cicero's return was carried; which at last it was, and in so splendid and triumphant a manner, that he had reason, he says, to fear, lest people should imagine that he himself had contrived his late flight for the sake of so glorious a restoration.

Cicero, now in his 50th year, was restored to his former dignity, and soon after to his former fortunes; satisfaction being made to him for the ruin of his estates and houses; which last were built up again by himself with more magnificence than before. But he had domestic grievances about this time, which touched him very nearly; and which, as he signifies obscurely to Atticus, were of too delicate a nature to be expressed in a letter: They arose chiefly from the petulant humour of his wife, which began to give him frequent occasions of chagrin; and, by a series of repeated provocations, confirmed in him that settled disgust which at last ended in a divorce.

In the 56th year of his age, he was made proconsul of Cilicia; and his administration there gained him great honour. About this time the expectation of a breach between Cæsar and Pompey engaged the general attention. Crassus had been destroyed with

his army some years before in the war with the Parthians; and Julia, the daughter of Cæsar, whom Pompey married, and who, while she lived, was the cement of their union, was also dead in child-bed. Cæsar had put an end to the Gallic war, and reduced the whole province to the Roman yoke: but though his commission was near expiring, he seemed to have no thoughts of giving it up, and returning to the condition of a private subject. He pretended that he could not possibly be safe if he parted with his army; especially while Pompey held the province of Spain prolonged to him for five years. This disposition to a breach Cicero soon learned from his friends, as he was returning from his province of Cilicia. But as he foresaw the consequences of a war more clearly and fully than any of them, so his first resolution was to apply all his endeavours and authority to the mediation of a peace; though, in the event of a breach, he was determined within himself to follow Pompey. He clearly foresaw, what he declared without scruple to his friends, that which side ever got the better, the war must necessarily end in a tyranny. The only difference, he said, was, that, if their enemies conquered, they should be proscribed; if their friends, they would be slaves.

He no sooner arrived at the city, however, than he fell, as he tells us, into the very flame of civil discord, and found the war in effect proclaimed: for the senate had just voted a decree, that Cæsar should disband his army by a certain day, or be declared an enemy; and Cæsar's sudden march towards Rome effectually confirmed it. In the midst of all this hurry and confusion, Cæsar was extremely solicitous about Cicero; not so much to gain him, for that was not to be expected, as to prevail with him to stand neuter. He wrote to him several times to that effect; and employed all their common friends to press him with letters on that subject: all which was done; but in vain, for Cicero was impatient to be gone to Pompey. In the mean time, these letters give us a most sensible proof of the high esteem and credit in which Cicero flourished at this time in Rome; when, in a contest for empire, which force alone was to decide, we see the chiefs on both sides so solicitous to gain a man to their party, who had no peculiar skill in arms, or talents for war. Pursuing, however, the result of all his deliberations, he embarked at length to follow Pompey, who had been obliged to quit Italy some time before, and was then at Dyrrhachium; and arrived safely in his camp with his son, his brother, and his nephew, committing the fortunes of the whole family to the issue of that cause. After the battle of Pharsalia, in which Pompey was defeated, Cicero returned into Italy, and was afterwards received into great favour by Cæsar, who was now declared dictator the second time, and Mark Antony his master of horse. We may easily imagine, what we find indeed from his letters, that he was not a little discomposed at the thoughts of an interview with Cæsar, and the indignity of offering himself to a conqueror against whom he had been in arms: for though upon many accounts he had reason to expect a kind reception from Cæsar, yet he hardly thought his life, he says, worth begging; since what was given by a master,

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fler, might always be taken away again at pleasure. But at their meeting, he had no occasion to say or do any thing that was below his dignity : for Cæsar no sooner saw him than he alighted, ran to embrace him, and walked with him alone, conversing very familiarly for several furlongs.

Cicero was now in his 61st year, and forced at last to part with his wife Terentia ; whose humour and conduct had been long uneasy to him. She was a woman of an imperious and turbulent spirit : and though he had borne her perverseness in the vigour of health, and flourishing state of his fortunes ; yet, in a declining life, soured by a continual succession of mortifications from abroad, the want of ease and quiet at home was no longer tolerable to him. But he was immediately oppressed by a new and most cruel affliction, the death of his beloved daughter Tullia, who died in child-bed soon after her divorce from her third husband Dolabella. She was about 32 years old, at the time of her death ; and, by the few hints which are left of her character, appears to have been an excellent and admirable woman. She was most affectionately and piously observant of her father ; and, to the usual graces of her sex, having added the more solid accomplishments of knowledge and polite letters, was qualified to be the companion and delight of his age ; and was justly esteemed not only as one of the best, but the most learned, of the Roman ladies. His affliction for the death of this daughter was so great, that, to shun all company as much as he could, he removed to Atticus's house, where he lived chiefly in his library, turning over every book he could meet with on the subject of moderating grief. But finding his residence here too public, and a greater resort to him than he could bear, he retired to Astura, one of his seats near Antium ; a little island on the Latian shore, at the mouth of a river of the same name, covered with woods and groves cut into shady walks ; a scene of all others the fittest to indulge melancholy, and where he could give a free course to his grief. " Here (says he to Atticus) I live without the speech of man ; every morning early I hide myself in the thickest of the wood, and never come out till the evening. Next to yourself, nothing is so dear to me as this solitude ; and my whole conversation is with my books." Indeed his whole time was employed in little else than reading and writing during Cæsar's administration, which he could never cheerfully submit to ; and it was within this period, that he drew up one of the gravest of these philosophical pieces which are still extant in his works.

Upon the death of Cæsar, Octavius, his nephew and heir, coming into Italy, was presented to Cicero by Hirtius and Panfa ; with the strongest professions on the part of the young man, that he would be governed entirely by his direction. Indeed Cicero thought it necessary to cherish and encourage Octavius, if for nothing else yet to keep him at a distance from Antony ; but could not yet be persuaded to enter heartily into his affairs. He suspected his youth and want of experience ; and that he had not strength enough to deal with Antony ; and, above all, that he had no good disposition towards the conspirators. He thought it impossible he should ever be a friend to

them ; and was persuaded rather, that if ever he got the upper hand, his uncle's acts would be more violently enforced, and his death more cruelly revenged than by Antony himself. And when Cicero did consent at last to unite himself to Octavius's interests, it was with no other view but to arm him with a power sufficient to oppress Antony ; yet so checked and limited, that he should not be able to oppress the republic.

In the hurry of all these politics, he was still prosecuting his studies with his usual application ; and, besides some philosophical pieces, now finished his book of offices, or the duties of man, for the use of his son : A work admired by all succeeding ages as the most perfect system of heathen morality, and the noblest effort and specimen of what reason could do in guiding man through life with innocence and happiness. However, he paid a constant attention to public affairs ; missed no opportunities, but did every thing that human prudence could do for the recovery of the republic : for all that vigour with which it was making this last effort for itself, was entirely owing to his counsels and authority. This appears from those memorable Philippics which from time to time he published against Antony ; as well as from other monuments of antiquity. But all was in vain : for though Antony's army was entirely defeated at the siege of Modena, which made many people imagine that the war was at an end and the liberty of Rome established ; yet the death of the consuls Panfa and Hirtius in that action, gave the fatal blow to all Cicero's schemes, and was the immediate cause of the ruin of the republic.

Octavius having subdued the senate to his mind, marched towards Gaul to meet Antony and Lepidus ; who had already passed the Alps, and brought their armies into Italy, in order to have a personal interview with him ; which had been privately concerted for settling the terms of a triple league, and dividing the power and provinces of Italy among themselves. The place appointed for this interview was a small island about two miles from Bononia, formed by the river Rhenus which runs near that city. Here they met, and spent three days in a close conference to adjust the plan of their accommodation : and the last thing they adjusted was the list of a proscription which they were determined to make of their enemies. This, as the writers tell us, occasioned much difficulty and warm contests among them ; till each in his turn consented to sacrifice some of his best friends to the revenge and resentment of his colleagues. Cicero was at his Tusculan villa, when he first received the news of the proscription and of his being included in it. It was the design of the triumvirate to keep it a secret, if possible, to the moment of execution ; in order to surprise those whom they had destined to destruction, before they were aware of their danger, or had time to make their escape. But some of Cicero's friends found means to give him early notice of it ; upon which he set forward to the sea-side, with a design to transport himself out of the reach of his enemies. There, finding a vessel ready, he presently embarked ; but the winds being adverse, and the sea uneasy to him, after he had sailed about

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Cichorium.

two leagues along the coast, he was obliged to land, and spend the night on shore. From thence he was forced, by the importunity of his servants, on board again; but was soon afterwards obliged to land at a country-seat of his, a mile from the shore, weary of life, and declaring he was resolved to die in that country which he had so often saved: here he slept soundly for some time, till his servants once more forced him away in a litter towards the ship, having heard that he was pursued by Antony's assassins. They were scarce departed, when the assassins arrived at his house; and, perceiving him to be fled, pursued him immediately towards the sea, and overtook him in a wood that was near the shore. Their leader was one Popilius Lenas, a tribune of the army, whose life Cicero had formerly defended and saved. As soon as the soldiers appeared, the servants prepared to defend their master's life, at the hazard of their own; but Cicero commanded them to let him down and make no resistance. They soon cut off his head and his hands, returning with them to Rome, as the most agreeable present to their cruel employer. Antony, who was then at Rome, received them with extreme joy, rewarding the murderer with a large sum of money, and ordering the head to be fixed upon the rostra between the two hands: a sad spectacle to the city; and what drew tears from every eye, to see those mangled members which used to exert themselves so gloriously from that place, in defence of the lives, the fortunes, and the liberties of the Roman people, so lamentably exposed to the scorn of sycophants and traitors. The deaths of the rest, says an historian of that age, caused only a private and particular sorrow, but Cicero's an universal one. It was a triumph over the republic itself; and seemed to confirm and establish the perpetual slavery to Rome. Antony considered it as such; and, satisfied with Cicero's blood, declared the proscription at an end. Cicero was killed on the seventh of December, in the 64th year of his age, about ten days from the settlement of the first triumvirate.

CICHORIUM, succory; a genus of the polygama æqualis order, belonging to the syngenesia class of plants.

Species. 1. The intybus, or wild succory, grows naturally by the sides of roads, and in shady lanes in many places of Britain. It sends out long leaves from the roots, from between which the stalks arise, growing to the height of three or four feet, and branching out into smaller ones. The flowers come out from the sides of the stalks, and are of a fine blue colour. They are succeeded by oblong seeds covered, inclosed in a down. 2. The spinosum, with a prickly forked stalk, grows naturally on the sea-coasts in Sicily, and the islands of the Archipelago. This sends out from the root many long leaves which are indented on their edges, and spread flat on the ground; from between these arise the stalks, which have very few leaves, and those are small and entire: these stalks are divided in forks upward, and from between them come out the flowers which are of a pale blue colour and are succeeded by seeds shaped like those of the common forts. The ends of the smaller branches are terminated by star-like spines which are very sharp. 3. The

endivia, or succory with broad crenated leaves, differs *Cichorium*. from the wild fort in its duration, being only annual, whereas the wild fort is perennial.

Culture, &c. The last species may be considered both as an annual and biennial plant. If sown early in the spring, or even any time before the beginning of June, the plants very commonly fly up to seed the same summer, and perish in autumn. If sown in June and July, they acquire perfection in autumn, continue till the next spring, then shoot up stalks for flower and seed, and soon after perish. The inner leaves are the useful parts. These when blanched white to render them crisp and tender, and reduce them from their natural strong taste to an agreeably bitter one, are then fit for use. They are valued chiefly as ingredients in autumn and winter salads, and for some culinary uses. The principal season of them is from the latter end of August till Christmas or longer, according to the temperature of the season; though the curled kinds generally resist the frosts of our ordinary winters, and remain in tolerable perfection till March or April. They are propagated by seeds sown in an open spot of ground, from which the plants are to be removed into open beds or borders where they may remain to grow to full size. The season for sowing these seeds is from the beginning of June to the end of July; and to have a regular supply of plants, it is proper to perform three different sowings at about three weeks or a month's interval. The great excellence of endive is to have its inner leaves finely whitened or blanched. They naturally incline to whiteness of themselves, but this may be greatly improved by art when the plants are arrived at full growth. Different methods are practised for this purpose, such as tying the leaves together; taking up the plants, and replanting them directly, almost to their tops, in ridges of dry earth, laying boards or tiles flat-ways on the top of the plants; but the first is found to answer the purpose most effectually. The proper time for beginning this work is, when the leaves are almost full grown; that is, when they are so far advanced that the leaves of the different plants interfere with one another, and their hearts are full and bushy; but they are not all to be tied up at once, only a due supply of the largest and forwardest plants, once every ten or twelve days according to the demand; for the blanching takes up about three weeks. Blanching in ridges of earth, however, is sometimes practised in winter when a severe frost is setting in; for by burying them in the earth almost to their tops, they are more out of the power of the cold. In November or December, when hard weather is approaching, let a piece of light ground that lies warm, be trenched up in one or more sharp ridges two or three feet wide at bottom, and near as much in height, sideways to the sun, making the sides as steep as possible, that the wet may run quickly off; then, in a dry day, take up a quantity of your full grown plants, with their roots entire, and divesting them of damaged leaves, gather each plant close in your hand, placing them horizontally in the sunny-side of the ridge of earth almost to their tops, and about six or eight inches each way distant. In severe frost, it will be proper to bestow some covering on the plants.

Medicinal

Cicindela.

Cid.

Medicinal uses. The roots and leaves of the wild succory, and seeds of the endive, are articles of the *matéria medica*. The first has a moderately bitter taste, with some degree of roughness; the leaves are somewhat less bitter; and the darker coloured and more deeply jagged they are, the bitterer is their taste. Wild succory is an useful detergent, aperient, and attenuating medicine, acting without much irritation, tending rather to cool than to heat the body; and, at the same time, corroborating the tone of the intestines. All the parts of the plant, when wounded, yield a milky saponaceous juice. This, when taken in large quantities, so as to keep up a gentle diarrhoea, and continued for some weeks, has been found to produce excellent effects in scorbutic and other chronic disorders. The qualities of the endive are nearly of the same kind. The seeds are ranked among the four lesser cold ones.

CICINDELA, in zoology, a genus of insects belonging to the order of coleoptera. The antennae are setaceous; the jaws prominent, and furnished with teeth; the eyes are a little prominent; and the breast is roundish and margined. There are 14 species.

CICLUT, or CICLUGH, a strong frontier town of Dalmatia, situated on the river Narenta, in E. Long. 17. 40. N. Lat. 45. 20. It is surrounded with walls built in the ancient manner, and was taken by the Venetians from the Turks in 1694.

CICUTA, properly signifies an hollow intercepted between two knots, of the stalks or reeds of which the ancient shepherds used to make their pipes. It is now, however, generally used to signify the water hemlock, and also the common fort; but Linnæus has described the latter under the old name of *Centum*. See that article.

There are three species of water-hemlock; the virgata, the bulbifera, and the maculata. Of these the first is the only one remarkable, and that for the poisonous qualities of its roots, which have been often known to destroy children who eat them for parsnips.

CICUTA is also used, chiefly among the ancients, for the juice or liquor expressed from the above plant, being the common poison wherewith the state criminals at Athens were put to death: Though some have suggested, that the poisonous draught to which the Athenians doomed their criminals was an inspissated juice compounded of the juice of *cicuta*, and some other corrosive herbs.

Socrates drank the *cicuta*.—Plato, in his dialogue on the immortality of the soul, observes, that “The executioner advised Socrates not to talk, for fear of causing the *cicuta* to operate too slowly.” M. Petit, in his *Observations Miscellaneæ*, remarks, that this advertisement was not given by the executioner out of humanity, but to save the *cicuta*: for he was only allowed to much poison *per ann.* which, if he exceeded, he was to furnish at his own expence. This construction is confirmed by a passage in Plutarch: the executioner who administered the *cicuta* to Phocion, not having enough, Phocion gave him money to buy more; observing by the way, “that it was odd enough, that at Athens a man must pay for every thing, even his own death.”

CID (Roderigo Dias le), a Castilian officer, who

was very successful against the Moors, under Ferdinand II. king of Castile; but whose name would hardly have been remembered, if Corneille had not made his passion for Chimene the subject of an admired tragedy, founded on a simple but affecting incident. The Cid is desperately in love with Chimene, daughter of the Count de Gones: but he is at variance with the Count; and being challenged by him, kills him in a duel. The conflict between love and honour in the breast of Chimene, who at length pardons and marries the Cid, forms the beauty of the piece. He died in 1098.

CIDARIS, in antiquity, the mitre used by the Jewish high-priests. The Rabbins say, that the bonnet used by priests in general was made of a piece of linen cloth 16 yards long, which covered their heads like a helmet or turban; and they allow no other difference between the high-priest's bonnet and that of other priests, than that the one is flatter, and more in the form of a turban; whereas that worn by ordinary priests rose something more in a point.

CIGNANI (Carlo), an Italian painter, was born at Bologna in 1628; and was the disciple of Albani. He was esteemed by pope Clement XI. who nominated him prince of the academy of Bologna, and loaded him with favours. Cignani died at Forlì in 1719. The cupola of la Madonna del Fuoco at Forlì, in which he represented Paradise, is an admirable work. His principal pictures are at Rome, Bologna, and Forlì.

CILIA, the EYE-LASHES. See ANATOMY, II° 406. b, c.

CILIARE, or LIGAMENTUM CILIARE. *Ibid.* m. CILIATED LEAF, among botanical writers, one surrounded with parallel filaments somewhat like the hairs of the eye-lids.

CILICIA, an ancient kingdom of Asia, lying between the 36th and 40th degree of north latitude; bounded on the east by Syria, or rather by Mount Amanus, which separates it from that kingdom; by Pamphylia, on the west; by Isauria, Cappadocia, and Armenia Minor, on the north; and by the Mediterranean sea, on the south. It is so surrounded by steep and craggy mountains, chiefly the Taurus and Amanus, that it may be defended by a handful of resolute men against a numerous army, there being but three narrow passes leading into it, commonly called *Pyla Cilicia*, or the gates of Cilicia; one on the side of Cappadocia, called the *Pass of Mount Taurus*; and the other two called the *Pass of Mount Amanus*, and the *Pass of Syria*. The whole country was divided by the ancients into Cilicia Aspera, and Cilicia Campestris; the former called by the Greeks *Trachea* or *Stony*, from its abounding so with stones; and to this day, the whole province is called by the Turks, *Taa Wilaieth*, or the *Stony Province*.

According to Josephus, Cilicia was first peopled by Tarhish the son of Javan, and his descendants, whence the whole country was named *Tarshis*. The ancient inhabitants were in process of time driven out by a colony of Phœnicians, who, under the conduct of *Gelix*, first settled in the island of Cyprus, and from thence passed into the country which, from the leader, they called *Cilicia*. Afterwards, several other colonies from different nations settled in this kingdom,

Cidaris

Cilicia.

Cilicia. dom, particularly from Syria and Greece; whence the Cilicians in some places used the Greek tongue, in others the Syriac; but the former greatly corrupted by the Persian, the predominant language of the country being a dialect of that tongue. We find no mention of the kings of Cilicia after their settlement in that country, till the time of Cyrus, to whom they voluntarily submitted, continuing subject to the Persians till the overthrow of that empire; but governed to the time of Artaxerxes Mnemon, by kings of their own nation. After the downfall of the Persian empire, Cilicia became a province of that of Macedon; and, on the death of Alexander, fell to the share of Seleucus, and continued under his descendants till it was reduced to a Roman province by Pompey. As a proconsular province, it was first governed by Appian Claudius Pulcher; and after him by Cicero, who reduced several strong holds on Mount Amanus, in which some Cilicians had fortified themselves, and held out against his predecessor. It was on this occasion that the division, formerly mentioned, into Trachæa and Campestris, took place. The latter became a Roman province; but the former was governed by kings appointed by the Romans, till the reign of Vespasian, when the family of Tracondemonts being extinct, this part also made a province of the empire, and the whole divided into Cilicia *Prima*, Cilicia *Secunda*, and Isauria; the first took in all Cilicia Campestris, the second the coast of Cilicia Trachæa, and the last the inland parts of the same division. It is now a province of Asiatic Turkey; and is called *Guramania*, having been the last province of the Caramanian kingdom which held out against the Ottoman race.

That part of Cilicia called by the ancients *Cilicia Campestris*, was, if we believe Ammianus Marcellinus, one of the most fruitful countries of Asia; but the western part equally barren, though famous, even to this day, for an excellent breed of horses, of which 600 are yearly sent to Constantinople for the special use of the Grand Signior. The air in the inland parts is reckoned wholesome; but that on the sea-coast very dangerous, especially to strangers.

The rivers of any note are the Pyramus, which rises on the north side of mount Taurus, and empties itself into the Mediterranean between Iffus and Margarus; the Cydnus springs from the Antitaurus, passes through Tarsus, and disembogues itself into the Mediterranean. It is famous for the rapidity of its stream, and the coldness of its waters, which proved very dangerous to Alexander the Great.

The Cilicians, if we believe the Greek and Roman historians, were a rough unpolished race of people, unfair in their dealings, cruel, and liars even to a proverb. In the Roman times, they became greatly addicted to piracy. They first began, in the time of the Mithridatic war, to infect the neighbouring provinces along with the Pamphylans; and, being emboldened with success, they soon ventured as far as the coasts of Greece and Italy, where they took a vast number of slaves, whom they sold to the Cypriots and the kings of Egypt and Syria. They were, however, at last defeated and entirely suppressed by Pompey the Great. See (*History of*) ROME.

CILICIA *Terra*, in the natural history of the anti-

ents, a bituminous substance improperly called an earth, which, by boiling, became tough like bird-lime, and was used instead of that substance to cover the stocks of the vines for preserving them from the worms. It probably served in this office in a fort of double capacity, driving away these animals by its nauseous smell, and entangling them if they chanced to get amongst it.

CILICIUM, in Hebrew antiquity, a sort of habit made of coarse stuff, formerly in use among the Jews in times of mourning and distress. It is the same with what the Septuagint and Hebrew versions call sackcloth.

CILLEY, an ancient and famous town of Germany, in the circle of Austria, and in Upper Cariola. It is the capital of a county of the same name, and is situated on the river Saan, in E. Long. 15. 45. N. Lat. 46. 28.

CIMA, or SIMA, in architecture, the same with Cymatium, or OGEE.

CIMABUE (Giovani), a renowned painter, born at Florence in 1240, and the first who revived the art of painting in Italy. He painted, according to the custom of those times, in fresco, and in distemper; colours in oil not being then found out. He excelled in architecture as well as in painting; and was concerned in the fabric of Sancta Maria del Fior at Florence: during which employment he died at the age of 60, and left many disciples; among the rest Giotto, who proved an excellent master.

CIMBRI, an ancient Celtic nation, inhabiting the northern parts of Germany. They are said to have been descended from the Asiatic *Cimmerians*, and to have taken the name of *Cimbri* when they changed their old habitations. When they first became remarkable, they inhabited chiefly the peninsula now called *Jutland*, and by the ancients *Gimbrica Chersonesus*. About 113 years before Christ, they left their peninsula with their wives and children; and joining the Teutones, a neighbouring nation, took their journey southward in quest of a better country. They first fell upon the Boii, a Gaulish nation situated near the Hercynian forest. Here they were repulsed, and obliged to move nearer the Roman provinces. The republic being then alarmed at the approach of such multitudes of barbarians, sent an army against them under the consul Papirius Carbo. On the approach of the Roman army, the Cimbri made proposals of peace. The consul pretended to accept it; but having thrown them into a disadvantageous situation, treacherously attacked their camp. His perfidy was rewarded as it deserved; the Cimbri ran to arms, and not only repulsed the Romans, but, attacking them in their turn, utterly defeated them, and obliged the shattered remains of their forces to conceal themselves in the neighbouring forests. After this victory the Cimbri entered Transalpine Gaul, which they quickly filled with slaughter and desolation. Here they continued five or six years, when another Roman army under the consul Silanus marched against them. This general met with no better success than Carbo had done. His army was routed at the first onset; in consequence of which, all Narbonne Gaul was exposed at once to the ravages of these barbarians.

About

Cilicium
I
Cimbri.

Cimbri.

About 105 years before Christ, the Cimbri began to threaten the Roman empire itself with destruction. The Gauls marched from all parts with a design to join them, and to invade Italy. The Roman army was commanded by the proconsul Cæpio, and the consul Mallius; but as these two commanders could not agree, they were advised to separate, and divide their forces. This advice proved the ruin of the whole army. The Cimbri immediately fell upon a strong detachment of the consular army commanded by M. Aurelius Scaurus, which they cut off to a man, and made Scaurus himself prisoner. Mallius being greatly intimidated by this defeat, desired a reconciliation with Cæpio, but was haughtily refused. He moved nearer the consul, however, with his army, that the enemy might not be defeated without his having a share in the action. The Cimbri, by this movement, imagining the commanders had made up their quarrel, sent ambassadors to Mallius with proposals of peace. As they could not help going through Cæpio's camp, he ordered them to be brought before him; but finding they were empowered to treat only with Mallius, he could scarce be restrained from putting them to death. His troops, however, forced him to confer with Mallius about the proposals sent by the barbarians: but as Cæpio went to the consul's tent against his will, so he opposed him in every thing; contradicted with great obliquity, and insulted him in the grossest manner. The deputies on their return acquainted their countrymen that the misunderstanding between the Roman commanders still subsisted; upon which the Cimbri attacked the camp of Cæpio, and the Gauls that of Mallius. Both were forced, and the Romans slaughtered without mercy. Eighty thousand citizens and allies of Rome, with 40,000 servants and sutlers, perished on that fatal day. In short, of the two Roman armies only 10 men, with the two generals, escaped to carry the news of so dreadful a defeat. The conquerors destroyed all the spoil, pursuant to a vow they had made before the battle. The gold and silver they threw into the Rhone, drowned the horses they had taken, and put to death all the prisoners.

The Romans were thrown into the utmost consternation on the news of so terrible an overthrow. They saw themselves threatened with a deluge of Cimbri and Gauls, numerous enough to over-run the whole country. They did not, however, despair. A new army was raised with incredible expedition; no citizen whatever who was fit to bear arms being exempted. On this occasion also, fencing-masters were first introduced into the Roman camp, by which means the soldiers were soon rendered in a manner invincible. Marius, who was at that time in high reputation on account of his victories in Africa, was chosen commander, and waited for the Cimbri in Transalpine Gaul: but they had resolved to enter Italy by two different ways; the Cimbri over the eastern, and the Teutones and other allies over the western Alps. The Roman general therefore marched to oppose the latter, and defeated the Ambrones and Teutones with great slaughter*. The Cimbri, in the mean time, entered Italy, and struck the whole country with terror. Catulus and Sylla attempted to oppose them; but their soldiers were so intimidated by the fierce

countenances and terrible appearance of these barbarians, that nothing could prevent their flying before them. The city of Rome was now totally defenceless; and, had the Cimbri only marched briskly forwards, they had undoubtedly become masters of it; but they waited in expectation of being joined by their allies the Ambrones and Teutones, not having heard of their defeat by Marius, till the senate had time to recal him to the defence of his country. By their order he joined his army to that of Catulus and Sylla; and upon that union was declared commander in chief. The Roman army consisted of 52,300 men. The cavalry of the Cimbri were no more than 15,000, but their foot seemed innumerable; for, being drawn up in a square, they are said to have covered 30 furlongs. The Cimbri attacked the Romans with the utmost fury; but, being unaccustomed to bear the heats of Italy, they soon began to lose their strength, and were easily overcome. But they had put it out of their power to fly; for, that they might keep their ranks the better, they had, like true barbarians, tied themselves together with cords fastened to their belts, so that the Romans made a most terrible havock of them. The battle was therefore soon over, and the whole day employed only in the most terrible butchery. An hundred and twenty thousand were killed on the field of battle, and 60,000 taken prisoners. The victorious Romans then marched to the enemy's camp; where they had a new battle to fight with the women, whom they found more fierce than even their husbands had been. From their carts and waggons, which formed a kind of fortification, they discharged showers of darts and arrows on friends and foes without distinction. Then they first suffocated their children in their arms, and then they put an end to their own lives. The greatest part of them hanged themselves on trees. One was found hanging at a cart with two of her children at her heels. Many of the men, for want of trees and stakes, tied strings in running knots about their necks, and fastened them to the tails of their horses, and the horns and feet of their oxen, in order to strangle themselves that way; and thus the whole multitude was destroyed.

The country of the Cimbri, which, after this terrible catastrophe, was left a mere desert, was again peopled by the Scythians; who, being driven by Pompey out of that vast space between the Euxine and the Caspian sea, marched towards the north and west of Europe, subduing all the nations they met with in their way. They conquered Russia, Saxony, Westphalia, and other countries as far as Finland, Norway, and Sweden. It is pretended that Odin their leader traversed so many countries, and endeavoured to subdue them only with a view to excite the people against the Romans; and that the spirit of animosity which he had excited operated so powerfully after his death, that the northern nations combined to attack it, and never ceased their incursions till it was totally subverted.

CIMEX, or Bug, in zoology, a genus of insects belonging to the order of hemiptera. Linnaeus enumerates no fewer than 121 species. The lectularius, or common house-bug, is a well known insect. The methods of expelling them are various, as oil of turpentine

Cimbri
||
Cimex.

* See Ambrones and Teutones.

Cimolia
Cinchona.

pentine, the smoke of corn-mint, of narrow-leaved wild cress, of herb-robert, of the reddish agaric, of mustard, Guinea pepper, peas or turf, &c. See Bug.

CIMOLIA ALBA, the official name of the earth of which we now make tobacco-pipes. Its distinguishing characters are, that it is a dense, compact, heavy earth, of a dull white colour, and very close texture; it will not easily break between the fingers, and slightly stains the skin in handling. It adheres firmly to the tongue; melts very slowly in the mouth, and is not readily diffusible in water. It is found in many places. That of the Isle of Wight is much esteemed for its colour. Great plenty of it is found near Pole in Dorsetshire, and near Wedenbury in Staffordshire.

CIMOLIA Terra, in natural history, a name by which the ancients expressed a very valuable medicinal earth; but which latter ages have supposed to be no other than our tobacco-pipe clay and fuller's earth.

The *cimolia terra* of the ancients was found in several of the islands of the Archipelago; particularly in the island of Cimolus, from whence it had its name. It was used with great success in the erysipelas, inflammations, and the like, being applied by way of cataplasm to the part. They also used, as we do, what we call *cimolia*, or fuller's earth, for the cleansing of clothes. This earth of the ancients, though so long disregarded, and by many supposed to be lost, is yet very plentiful in Argentiére, (the ancient Cimolus,) Spanto, and many of those islands. It is a marl of a lax and crumbly texture, and a pure bright white colour, very soft to the touch. It adheres firmly to the tongue; and, if thrown into water, raises a little hissing and ebullition, and moulders to a fine powder. It makes a considerable effervescence with acids, and suffers no change of colour in the fire. These are the characters of what the ancients called simply *terra cimolia*; but besides this they had, from the same place, another earth which they called by the same general name, but distinguished by the epithet purple, *purpurejcentis*. This they described to be satiate, cold to the touch, of a mixed purple colour, and nearly as hard as a stone. And this was evidently the substance we call *steatites*, or the *soap-rock*, common in Cornwall, and also in the island of Argentiére, or Cimolus.

CIMON, the renowned Athenian general. See ATTICA, n° 95—103.

CINALOA, a province of Mexico in South America, abounding in corn, cattle, and cotton; and rendered extremely picturesque, by a number of beautiful cascades of clear water that fall down from the mountains. It lies on the eastern coast of the sea of California, and has a town of the same name, situated in N. Lat. 26°.

CINARA, in botany, the ARTICHOKE. See CYNARA.

CINCHONA, in botany, a genus of the monogynia order, belonging to the pentandria class of plants. There are two species. One of them, long remarkable for its bark, so much used in medicine under various names, is a native of some provinces of Peru in South America; the other, whose bark is but lately discovered to have the same medical virtues, is a native of Jamaica. The first was thought for a long

time to grow only in the province of Quito, on some hills near the city of Loxa; but it has since been found in other parts of that empire. It is a tree that seldom exceeds 18 feet in height, and is of a proportionally thickness. It grows in forests spontaneously among other trees; and is propagated by seeds which fall to the ground of themselves. Of the other species we have an account in the Phil. Trans. vol. 67. under Plate lxxiii. the name of *Cinchona Jamaicensis*. It grows on stony fig. 10. lands near the sea-shore on the north side of the island of Jamaica, and seldom exceeds 20 feet in height. The trunk is not thick in proportion, but hard, tough, and of a yellowish white colour on the inside. The branches and leaves are opposite; the leaves are of a rusty green, and the young buds of a bluish-green hue. It blossoms in November, and continues in flower till February, having on the same tree flowers and ripe pods. The flowers are of a dusky-yellow colour, and the pods black: when ripe they split in two, and are, with their flat brown seeds, in every respect similar to those of the first species, termed *cinchona officinalis*.

The bark of the cinchona officinalis hath now the highest reputation in the materia medica, and is justly looked upon as an almost universal medicine. It did not, however, acquire this great reputation all at once; nor, in all probability, when first discovered, did the cinchona merit those praises to which it is now so justly intitled. The reason of this is, that within these two centuries, as is observed by Dr Percival, the diseases of the European countries have assumed a new face. Formerly they were mostly of the inflammatory kind; and accordingly we find Dr Sydenham, a most experienced physician, treating almost all diseases in the manner proper for inflammatory ones. In these the Peruvian bark is pernicious. Its general characters are that of an astringent and corroborant; and these qualities necessarily augment inflammatory disorders. Now, to whatever cause it may be owing, diseases seem to arise mostly from a debility of the system, and hence the great efficacy of the bark in our times. At first it was only celebrated as a remedy for intermittent fevers; a long time after, it was discovered to be an antiseptic, to be efficacious in gangrenes, and mortifications, the scurvy, and all diseases in which there is a tendency to putrefaction. In the small-pox it is likewise of excellent use, where nature requires to be assisted in the expulsion of the variolous matter. The sanious and bloody matter in the variolous pustules also soon changes its appearance on the use of the bark; which needs only to be withheld if it is found to increase the difficulty of breathing. For the same reason it is exceedingly efficacious in foul old ulcers, very frequently correcting the sanies of them, and changing it into laudable pus. In nervous and putrid fevers, in sturuous affections also, particularly in ophthalmies of this kind, it has been found to be a remedy of great efficacy. The retrocession of the morbid matter in the measles is said to be powerfully prevented by the use of the bark; but where the lungs are affected, as they frequently are in this disease, the use of it is certainly to be avoided. Dr Percival informs us, that he had a patient who was seized with an intermittent while labouring under

a severe gonorrhœa. The bark was given him in large quantities ; and so far was it from lessening the discharge, that it evidently increased it, and lessened its virulence. The late Dr Whytt informs us, that, in 16 days, he swallowed near four ounces of the bark in substance, while labouring under a catarrhus cough, without feeling any bad effects from its astringent quality. In a tertian, attended with a violent cough and spitting, he prescribed the bark in the usual quantity, without its hurting the breast in the smallest degree. And he had repeated experience of its virtues in curing a hoarseness after the measles, when unattended with a fever and difficult respiration. In the whooping cough also, when given early, he found it one of the best remedies ; but here we must remark, that in some cases of the whooping cough where we have seen the bark administered, the disease was manifestly increased by it. Perhaps in these the medicine had been too long delayed. The bark has been successfully administered, in the quantity of a drachm every three hours, to a woman two days after her delivery, without lessening the lochia ; and it has been frequently given to others during their catamenia, without the least interruption of them. These and other facts are brought by Dr Percival, to prove that the prejudices against the use of the bark, which commonly take their rise from its known astringent quality, are altogether groundless.

As to the chemical analysis of this valuable medicine, the above mentioned author hath taken a great deal of pains to elucidate it. Other chemists had discovered that this, as well as many other vegetable substances, contains a mucilaginous and resinous part ; that the former is more soluble in water, and the latter in spirit of wine, &c. Dr Lewis particularly asserts, that the astringency of the Peruvian bark "resides wholly in its resin, which does not appear to be in any degree soluble in watery liquors." Also, that in making decoctions of the bark, the resin melts out in the first boilings ; and that the subsequent ones are transparent and bitter, without the least degree of turbidness or astringency. Both these assertions, however, Dr Percival hath shown to be mistakes. He digested a drachm of powdered bark 48 hours in two ounces of rectified spirit of wine. The clear tincture was then poured off, and fresh spirit, in the same quantity as before, added to the residuum. The digestion was repeated six times, until the menstruum acquired neither taste nor colour from the bark. The powder was then carefully dried and macerated without heat, in two several portions of spring-water, and communicated to each of them the property of striking a purple colour with green vitriol. Both the watery infusions were infpid ; from whence Dr Percival concludes, that rectified spirit of wine extracts all the biternefs, but not the astringency of the bark. To try the power of aqueous menstrua, he infused half an ounce of powdered bark in six ounces of cold spring-water for 48 hours, and boiled another half ounce for about 40 minutes in nine ounces of water. The cold infusion seemed to be at least as strong as the decoction ; and a considerable quantity of the resin appeared to have dissolved in the cold water ; for when boiled for some minutes over a quick fire, it grew turbid, and deposited a resinous precipitate. He now determined

to try whether it was possible to exhaust the bark of its resin by this treatment. Half an ounce of powdered bark was macerated for three days, in six ounces of water. The menstruum was then decanted off, and fresh water added in the same quantity as before. The effusion was repeated at equal intervals 30 times, till the water was infpid, colourless, and unalterable by the addition of green vitriol. The residuum also, when chewed in the mouth, had no sensible biternefs or astringency. Two drachms of this residuum, carefully dried by a very gentle heat, were infused in an ounce of rectified spirit of wine : in two days a tincture, of an orange colour and bitter taste was produced. This experiment was repeated with boiling water ; the bark was not exhausted till after the 25th coction ; and after all, gave a stronger tincture to spirit of wine than in the former case. These experiments shew how extremely difficult it is to exhaust the bark of its virtues ; neither is this only in appearance, but in reality ; for the same author informs us, that a quantity of bark, reduced by infusion and decoction to an infpid powder, was given in the dose of two drachms, to a person labouring under a quotidian ague, an hour or two before the coming on of the fit ; by which means the disease was changed into a tertian, and at last entirely removed. In short, Dr Percival hath clearly shown, that by one menstruum it is impossible to exhaust Peruvian bark entirely of its virtue ; but in order to determine with as much accuracy as possible the relation which different menstrua bear to it, he digested a drachm of the bark in three ounces of several different liquors. After seven days infusion, the clear part of each menstruum was carefully poured off, and the residuum evaporated to dryness. The weight lost by the bark in this experiment was thought to indicate the solvent power of each particular menstruum. The drachm infused in rectified spirit of wine, lost six grains ; in French brandy, eight grains and a quarter ; in Rhenish wine, nine grains ; in water, eight grains ; and in water and vinegar, the same quantity.

The doctor also tried a great number of other experiments with regard to the astringency and antiseptic qualities of the bark ; from whence he concludes, that its astringency is much less than has been commonly imagined ; and that in certain cases, particularly in bilious disorders, the addition of acids to the bark is necessary. Columbo-root he also thinks would be a useful addition in these diseases. From his experiments it would seem that a cold infusion of the bark is its best preparation ; but as that is very disagreeable to the taste, the addition of orange-peel and extract of liquorice will be found very convenient ; for these are found to cover the ill taste of this drug more effectually than any other.

The virtues of Peruvian bark were discovered by the Indians about the year 1500. A lake near a town in Peru was surrounded by these trees ; which were torn up by an earthquake, and falling into the adjacent water, they rendered it bitter. An Indian, urged by his thirst during a fever, under which he laboured, drank of this water, because no other could be had ; however, observing that he soon recovered, he related the case, and others were also cured. On

Cinchona
|
Cinnabar.

this enquiry was made, and to the trees it was found that the water owed its virtue; then it was soon discovered that the bark alone possessed the medicinal quality. In 1640, a Spanish soldier was quartered in an Indian's house, and being seized with an ague, his landlord, moved with compassion, told him of a cure, and with the same he cured his companions. At length the vice-queen, wife of the count de Cinchon, then vice-roy of Peru, was seized with an intermitting fever, this soldier cured her also; hence the name *cinchona* and *comitisse*. After this, father de Lugo brought a parcel of it to Rome, and from him it also received the name of *cort. card. de Lugo*. From Rome it was spread into France and England, and at length became general.

This bark is brought in pieces of different sizes, some rolled up in short thick quills, and others flat; the outside is brownish, and generally hath a whitish moss spread on it; the inside is of a yellowish, reddish, or rusty iron colour. The best sort is bitter, resinous, breaks close and smooth, is friable betwixt the teeth, pulverises easily, when powdered is of a cinnamon colour, but rather paler; and, according to the opinion of some, as the truest test of its goodness, it hath a musty kind of smell, and at the same time so much of the aromatic, as not to be disagreeable. The inferior kinds, when broken, appear woody, and in chewing separate into fibres. That which is called female bark, is redder in the inside; it is also thicker; and on the outside more white and smooth; is weaker to the smell and taste than the above; and, in medical virtue, greatly inferior.—The bark of the *cinchona jamaicensis* is found to yield its virtues much better to watery menstrua than the officinalis; and, as far as has yet been tried, seems not inferior in efficacy.

CININNATUS, the Roman dictator, was taken from the plough, to be advanced to the dignity of consul; in which office he restored public tranquillity, and then returned to his rural employments. Being called forth a second time to be dictator, he conquered the enemies of Rome, and, refusing all rewards, retired again to his farm, after he had been dictator only 16 days. The same circumstance appeared once more in the 80th year of his age. He died 376 years before Christ.

CINCTURE, in architecture, a ring, list, or orlo, at the top and bottom of the shaft of a column, separating the shaft at one end from the base, and at the other from the capital.

CINERITIOUS, an appellation given to different substances, on account of their resembling ashes either in colour or consistence; hence it is that the cortical part of the brain has sometimes got this epithet.

CINNABAR, in natural history, is either native or factitious.

The *native* cinnabar is an ore of quicksilver, moderately compact, very heavy, and of an elegant striated red colour.

Factitious cinnabar is a mixture of mercury and sulphur sublimed, and thus reduced into a fine red glebe. The best is of a high colour, and full of fibres like needles. See CHEMISTRY, n° 474, and PHARMACY, n° 753.—793.

The chief use of cinnabar is for painting. Although

the body is composed of sulphur, which is of a light colour, and mercury which is white as silver, it is nevertheless of an exceeding strong red colour. Lumps of it are of a deep brown red without brilliancy; but when the too great intensity of its colour is diminished by bruising and dividing it into small parts, (which is a method generally used to lessen the intensity of all colours), the red of the cinnabar becomes more and more exalted, flame-coloured, and exceedingly vivid and brilliant: in this state it is called vermilion.

Cinnabar is often employed as an internal medicine. Hoffman greatly recommends it as a sedative and antispasmodic; and Stahl makes it an ingredient in his *temperant powder*. Other intelligent physicians deny that cinnabar taken internally has any medicinal quality. Their opinion is grounded on the insolubility of this substance in any menstruum. This question concerning its internal utility cannot be decided without further researches and experiments; but cinnabar is certainly used with success to procure a mercurial fumigation, when that method of cure is proper in venereal diseases. For this purpose it is burnt in an open fire on red-hot coals, by which the mercury is disengaged and forms vapours, which, being applied to the body of the diseased person, penetrate through the pores of the skin, and produce effects similar to those of mercury administered by friction.

CINNAMON-TREE, in botany. See LAURUS.

CINNAMON-WATER, is made by distilling the bark first infused in spirit of wine, brandy, or white-wine.

Gloves CINNAMON, is the bark of a tree growing in Brazil, which is often substituted for real cloves.

White CINNAMON, called also *Winter's bark*, is the bark of a tree frequent in the isle of St Domingo, Guadalupe, &c. of a sharp biting taste like pepper. Some use it instead of nutmeg; and in medicine it is esteemed a stomachic and antiscorbutic.

CINNAMUS, a Greek historian, wrote a history of the eastern empire, during the reigns of John and Manuel Commenes, from 1118 to 1143. His style is reckoned the best of the modern Greek authors. He died after 1183.

CINQUEFOIL, in botany. See POTENTILLA.

CINQUE-PORTS, five havens that lie on the east part of England, towards France; thus called, by way of eminence on account of their superior importance, as having been thought by our kings to merit a particular regard, for their preservation against invasion. Hence they have a particular policy, and are governed by a keeper, with the title of *Lord-warden of the cinque-ports*.

Cambden tells us, that William the Conqueror first appointed a warden of the cinque-ports; but king John first granted them their privileges; and that upon condition they should provide eighty ships at their own charge for forty days, as often as the king should have occasion in the wars: he being then straitened for a navy to recover Normandy.

The five ports are Hastings, Romney, Hythe, Dover, and Sandwich.—Thorn tells us, that Hastings provided 21 vessels; and in each vessel 21 men. To this port belong Seaford, Pevensey, Hedney, Winchelsea, Rye, Hamne, Wakebourn, Creneth, and Fordcliffe.—Romney provided five ships, and in each 24 men.

To

Cinnamon
tree
|
Cinque-
ports.

Cintra
|
Cipher.

To this belong Bromhal, Lyde, Ofwarstone, Dange-mares, and Romenhal.—Hythe furnished five ships, and in each 21 seamen. To this belongs Westmeath.—Dover the same number as Haflings. To this belong Folkton, Feverham, and Marge.—*Laffly*, Sand-wich furnished the same with Hythe. To this belong Fordiwic, Reculver, Serre, and Deal.

The privileges granted to them in consequence of these services were very great. Amongst others they were each of them to send two barons to represent them in parliament; their deputies were to bear the canopy over the king's head at the time of his coronation, and to dine at the uppermost table in the great hall on his right hand; to be exempted from subsidies and other aids; their heirs to be free from personal wardship, notwithstanding any tenure; to be impleaded in their own towns, and not elsewhere; not to be liable to tolls, &c.

CINTRA, a cape and mountain of Portugal, in the province of Estremadura, usually called the *Rock of Lisbon*. It lies on the north side of the entrance of the river Tajo; and there is a town of the same name situated thereon. W. Long. 10. 15. N. Lat. 59. 0.

CINUS, or CYNUS, a famous civilian of Pistoia in the 14th century. His commentary on the Code was finished in 1313; he also wrote on some parts of the digest. He was no less famous for his Italian poems; and is ranked among those who first gave grace to the Tuscan lyric poetry.

CINYRA, in the Jewish antiquities, a musical instrument. This, and the Hebrew *cinnor*, which is generally translated *cithara*, *lyra*, or *psalterium*, are the same. It was made of wood, and was played on the temple of Jerusalem. Josephus says that the *cinyra* of the temple had ten strings, and that it was touched with a bow. In another place he says that Solomon made a great number of them with a precious kind of metal called *electrum*; wherein he contradicts the scripture, which inform us that Solomon's *cinnors* were made of wood.

CION, or CYON, in gardening, a young shoot, sprout, or sprig, put forth by a tree. Grafting is performed by the application of the cion of one plant upon the stock of another. To produce a stock of cions for grafting, planting, &c. the gardeners sometimes cut off the bodies of trees a little above the ground, and only leave a stump or root standing; the redundant sap will not fail next spring to put forth a great number of shoots. In dressing dwarf-trees, a great many cions are to be cut off.

CIOTAT, a sea-port town of Provence in France; famous for Muscadine wine. It is seated on the bay of Laquea, between Marseilles and Toulon; and the harbour is defended by a strong fort. E. Long. 5. 30. N. Lat. 43. 10.

CIPHER, or CYPHER, one of the Arabic characters or figures used in computation, formed thus, 0. See ARITHMETIC.

CIPHER is also a kind of enigmatic character, composed of several letters interwoven, which are generally the initial letters of the persons names for whom the ciphers are intended. These are frequently used on seals, coaches, and other moveables.—Anciently,

merchants and tradesmen were not allowed to bear arms: in lieu thereof, they bore their ciphers, or the initial letters of their names, artfully interwove about a cross; of which we have divers instances on tombs, &c. See DEVISE.

CIPHER, denotes likewise certain secret characters disguised and varied, used in writing letters that contain some secret, not to be understood but by those between whom the cipher is agreed on.

De la Guilletiere, in his *Lacedæmon ancient and modern*, endeavours to make the ancient Spartans the inventors of the art of writing in cipher. Their scytala, according to him, was the first sketch of this mysterious art: these scytalæ were two rollers of wood, of equal length and thickness; one of them kept by the ephori; the other by the general of the army sent on any expedition against the enemy. Whensoever those magistrates would send any secret orders to the general, they took a slip of parchment, and rolled it very justly about the scytala which they had reserved; and in this state wrote their intentions, which appeared perfect and consistent while the parchment continued on the roller: when taken off, the writing was maimed, and without connection; but was easily retrieved by the general, upon his applying it to his scytala.

Polybius says, that Æneas Tactitus, 2000 years ago collected together 20 different manners of writing lo as not to be understood by any but those in the secret; part whereof were invented by himself, and part used before his time.—Trithemius, Cap. Porta, Vigenere, and P. Nicéron, have wrote expressly on the subject of ciphers.

As the writing in cipher is become an art; so is the reading, or unravelling thereof, called *deciphering*.—The rules of deciphering are different in different languages. By observing the following, you will soon make out any common cipher wrote in English.

1. Observe the letters or characters that most frequently occur; and set them down for the six vowels, including *y*; and of these the most frequent will generally be *e*, and the least frequent *u*.

2. The vowels that most frequently come together are *ea* and *ou*.

3. The consonant most common at the ends of words is *s*, and the next frequent *r* and *t*.

4. When two similar characters come together, they are most likely to be the consonants *f*, *l*, or *s*, or the vowels *e* or *o*.

5. The letter that precedes or follows two similar characters is either a vowel, or *l*, *m*, *n*, or *r*.

6. In deciphering, begin with the words that consist of a single letter, which will be either *a*, *I*, *e*, or *o*.

7. Then take the words of two letters, one of which will be a vowel. Of these words the most frequent are, *an*, *to*, *be*, *by*, *of*, *on*, *or*, *no*, *so*, *ai*, *at*, *if*, *in*, *is*, *it*, *he*, *me*, *my*, *us*, *we*, *am*.

8. In words of three letters there are most commonly two consonants. Of these words the most frequent are, *the*, *and*, *not*, *but*, *yet*, *for*, *tho'*, *how*, *why*, *all*, *you*, *she*, *his*, *her*, *our*, *who*, *may*, *can*, *did*, *was*, *are*, *has*, *had*, *let*, *one*, *two*, *six*, *ten*, &c.*

II T 2

9. The

* Some of these, or those of two letters, will be found in every sentence.

Cipher.

Cipher.

9. The most common words of four letters are, *this, that, then, thus, with, when, from, here, some, most, none, they, them, whom, mine, your, self, must, will, have, been, were, four, five, nine, &c.*

10. The most usual words of five letters are, *these, those, which, were, while, since, their, shall, might, could, would, ought, three, seven, eight, &c.*

11. Words of two or more syllables frequently begin with double consonants, or with a preposition; that is, a vowel joined with one or more consonants. The most common double consonants are *bl, br, dr, fl, fr, gl, gr, ph, pl, pr, sh, st, th, tr, wh, wr, &c.* and the most common propositions are *con, con, de, dis, ex, in, in, int, mis, par, pre, pro, re, sub, sup, un, &c.*

12. The double consonants most frequent at the end of long words are, *ck, ld, lf, mn, nd, ng, rl, rm, rn, rp, rt, sn, st, xt, &c.* and the most common terminations are *cd, en, er, et, eng, ly, son, sion, tion, able, ence, ent, ment, full, less, ness, &c.*

On Plate LXXIX. fig. 7. is given an example of a cipher wrote in arbitrary characters as is commonly practised. It will be easily deciphered by observing the rules: but when the characters are all placed close together, as in the example fig. 8. and as they always should be, the deciphering is much more difficult.

To decipher a writing of this sort you must first look for those characters that most frequently occur, and set them down for vowels as before. Then observe the similar characters that come together; but you must remember that two such characters may here belong to two words. You are next to remember the combinations of two or three characters that are most frequent; which will be some of the words in the seventh and eighth of the foregoing rules; and by observing the other rules, you will infallibly discover, with time and attention, any cipher wrote on these principles.

When the words are wrote all close together, if the key to the cipher were to be changed every word, according to a regular method agreed on between the parties, as might be done by either of the methods mentioned in N^o II. below, with very little additional trouble, the writing would then be extremely difficult to decipher. The longer any letter wrote in cipher is, the more easy it is to decipher, as then the repetitions of the characters and combinations are the more frequent.

The following are the contents of the two foregoing ciphers; in which we have inverted the order of the words and letters, that they who are desirous of trying their talent at deciphering, may not, inadvertently, read the explanation before the cipher.

enil eno ton dna shnmo elolw eerht, suoidisrep dna leure o. noituae & enedupr fo klat llw uoy : on, rotiait, tcelgen & enereffidni si ti. yltrohs rettelt a em dnes ot snaem emof dnif rehtie, trach eht morf semoc ti talit ees em tel &, erom ecaf ym ees ot erad reven ro.

evlewft fo ruoh eht ta thgin siht, ledatic eht fo etag eht erofeb elbmelfa llw shneir ruo lla. ruoh eht ot lautncup eb : deraperp llw emoc dna, ytrebil ruoy niager ot, ylevarb eid ro. thgin eht si siht, su sekam rehtie talit, etiuq su scodau ro.

Contrivances for communicating intelligence by CIPHER.

Cipher.

I. By means of a pack of cards. The parties must previously agree in what manner the cards shall be first placed, and then how they shall be shuffled. Thus suppose the cards are to be first placed in the order as hereafter follows, and then shuffled by taking off 3 from the top, putting the next 2 over them, and the following 3 under them*, and so alternately. Therefore the party who sends the cipher first writes the contents of it on a separate paper, and then copies the first 32 letters on the cards, by writing one letter on every card; he then shuffles them, in the manner described, and writes the second 32 letters: he shuffles them a second time, and writes the third 32 letters, and so of the rest. An example will make this plain. Suppose the letter to be as follows:

I am in full march to relieve you; within three days I shall be with you. If the enemy in the mean time should make an assault, remember what you owe to your country, to your family and yourself. Live with honour, or die with glory.

Order of the cards before the 1st shuffle.

Ace spades	i a d u y i
Ten diamonds	a l e u l
Eight hearts	u l u o i u
King spades	i s u n l
Nine clubs	n h l e o
Seven diamonds	f b u r i
Nine diamonds	u e a c t n
Ace clubs	l w k r y i
Knave hearts	l s e e a
Seven spades	m i a r m w
Ten clubs	a i t h e r
Ten hearts	r r h o f
Queen spades	c h e e t
Eight diamonds	h a h y w
Eight clubs	t y o o o l
Seven hearts	o y a o h o
Queen clubs	r o u u y h
Nine spades	e u i y f y
King hearts	l e t e u o
Queen diamonds	i d s o e
Eight spades	e i n w s o
Knave clubs	v f a n t g
Seven clubs	e t s l y
Ace hearts	y r e b r
Nine hearts	o l n w o t
Ace diamonds	u h s t b d
Knave spades	w l m a l
Ten spades	i e y t r r
King diamonds	t t i b u r
Queen hearts	h h m n u
King clubs	i n a t h
Knave diamonds	n e u r o

The person that receives these cards first places them in the order agreed on, and transcribes the first letter on every card. He then shuffles them, according to order, and transcribes the second letter on each card. He shuffles them a second time and transcribes the third letters; and so of the rest.

If the cards were to be shuffled the second time by threes and fours, the third time by twos and fours, &c.

* By shuffling the cards in this manner, there will remain only 2 to put under at last.

Cipher.

it would make the cipher still more difficult to discover : though as all ciphers depend on the combination of letters, there are scarce any that may not be deciphered with time and pains ; as we shall flow further on. Those ciphers are the best, that are by their nature most free from suspicion of being ciphers ; as for example, if the letters were here wrote with one of the sympathetic inks, described in the fourth volume of this work, the cards might then pass for a common pack.

II. *By a dial.* On a piece of square pasteboard ABCD, fig. 3. 4. draw the circle EFGH, and divide it into 26 equal parts, in each of which must be wrote one of the letters of the alphabet.

On the inside of this there must be another circle of pasteboard, ILMN, moveable round the centre O, and the extremity of this must be divided into the same number of equal parts as the other. On this also must be wrote the letters of the alphabet, which, however, need not be disposed in the same order. The person with whom you correspond must have a similar dial, and at the beginning of your letter you must put any two letters that answer to each other when you have fixed the dial.

Exam. Suppose you would write as follows : " If you will come over to us, you shall have a pension, and you may still make a sham opposition." You begin with the letters *Ma*, which show how the dial is fixed : then for *If you*, you write *un juc*, and so for the rest, as you will see at fig. 6.

The same intention may be answered by a ruler, the upper part of which is fixed and the lower part made to slide ; but in this case the upper part must contain two alphabets in succession, that some letter of that part may constantly correspond to one in the lower part. The divisions standing directly over each other in a straight line will be much more obvious than in the circumference of a circle. Or two straight pieces of pasteboard regularly divided, the one containing a single and the other a double alphabet, would answer exactly the same purpose. In this case a blank space may be left at each end of the single alphabet, and one or two weights being placed on both the pieces will keep them steady.

III. *The corresponding spaces.* Take two pieces of pasteboard or stiff paper, through which you must cut long squares, at different distances, as you will see in the following example. One of these pieces you keep yourself, and the other you give to your correspondent. When you would send him any secret intelligence, you lay the pasteboard upon a paper of the same size, and in the spaces cut out, you write what you would have understood by him only, and then fill up the intermediate spaces with somewhat that makes with those words a different sense.

[I shall be] much obliged to you, as reading [alone] engages my attention [at] present, if you will lend me any one of the [eight] volumes of the Spectator. I hope you will excuse [this] freedom, but for a winter's [evening] I [don't] know a better entertainment. If I [fail] to return it soon, never trust me for the time [to come].

Cipher

CIPPUS.

A paper of this sort may be placed four different ways, either by putting the bottom at the top, or by turning it over, and by those means the superfluous words may be the more easily adapted to the sense of the others.

This is a very eligible cipher, as it is free from suspicion, but it will do only for short messages : for if the spaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together : and if the sense be not clear, the writing will be liable to suspicion.

IV. *The musical cipher.* The construction of this cipher, is similar to that of N^o II. The circle EFGH (fig. 3.) is to be divided into twenty-six equal parts, in each part there must be wrote one of the letters of the alphabet : and on the anterior circle ILMN, moveable round the center O, there is to be the same number of divisions : the circumference of the inner circle must be ruled in the manner of a music paper ; and in each division there is to be placed a note, differing either in figure or position. Lastly, within the musical lines place the three keys, and on the outer circle, the figures that are commonly used to denote the time.

Then provide yourself with a ruled paper, and place one of the keys, as suppose that of *g re sol*, against the time two-fourths at the beginning of the paper, which will inform your correspondent how to fix his circle. You then copy the notes that answer to the several letters of the words you intend to write, in the manner expressed at fig. 5.

A cypher of this sort may be made more difficult to discover by frequently changing the key, and that will not in the least embarrass the reader. You may likewise add the mark *#* or *b* to the note that begins a word, which will make it more easy to read, and at the same time give the music a more natural aspect. This cipher is preferable to that of N^o II. above, as it may be inclosed in a letter about common affairs, and pass unsuspected.

CIPPUS, in antiquity, a low column, with an inscription, erected on the high roads, or other places, to shew the way to travellers ; to serve as a boundary ; to mark the grave of a deceased person, &c.

CIR (St), a village of France, two miles from Versailles, remarkable for a nunnery founded here by Lewis XIV. The nuns are obliged to take care of the education of 250 girls, who must prove their families to have been noble from the 4th generation on the father's side. They cannot enter before 7, nor after 12 years of age : and they continue there till they are 20 years and 3 months old. The house is a most magnificent structure.

CIRCÆA, ENCHANTER'S NIGHT-SHADE, a genus of the monogynia order belonging to the diandria class of plants. There are two species, one of which is a native of Britain, and the other of Germany. They are low herbaceous plants with white flowers, and possessed of no remarkable property.

CIRCASSIA, a large country of Asia, lying between the rivers Don and Wolga ; bounded on the north by Russia, on the east by Astrachan and the Caspian sea,

on

on the south by Georgia and Dagistan, and on the west by the sea of Zabach. It is full of mountains and forests, and has no other city but Terky, which is seated on the Caspian sea. It is a kind of republic; for the people put themselves under the protection of Persia, Russia, and the Turks: however, the last are in possession of Terky, the capital town. They are Tartars of a middle stature, well-set, with coarse black hair and broad flat faces. They wear a vest of coarse grey cloth, and over it a sheep's skin, which they turn to the side from which the wind or rain comes. They have boots of horse leather, and wear on their heads round bonnets of coarse felt or black cloth. The women pass among the Turks for very great beauties, their complexion being extremely fine. The men are not jealous; for they allow their wives all imaginable liberties. These, in the summer, wear nothing but a shift open down to the navel; but in the winter they have furred gowns, like the Russians. They are very fond of necklaces, which consist of strings of pearls, or coloured glass. It is not a little surprising that the men should be so ugly, and the women so extremely handsome. Their religion is a mixture of Christianity and Mahometanism; and, like the Jews, they marry their brother's wives, if they have no children. The men are good horsemen, and subsist chiefly by hunting and robbing, though some are addicted to husbandry. In winter they live in forty huts, and in the summer in tents. Their female children are generally bought by the Turks and Persians, who bring them up for their seragios.

CIRCE, in fabulous history, a famous sorceress, poisoned her husband, king of the Sarmatæ; for which being banished, she came into Italy, where she changed Scylla into a sea-monster; the entertained Ulysses, who was cast away on the coast near her house, but metamorphosed his companions into different sorts of beasts.

CIRCENSIAN GAMES, a general term, under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Most of the feasts of the Romans were accompanied with Circensian games; and the magistrates, and other officers of the republic, frequently presented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 15th of September. There were six kinds of games exhibited: the first was wrestling, and fighting with swords, with staves, and with pikes; the second was racing; the third leaping; the fourth, quoits, arrows, and cestus; all which were on foot: the fifth was horse-courting; the sixth courses of chariots.

CIRCLE, in geometry, a plane figure comprehended by a single curve line, called its circumference, to which right lines drawn from a point in the middle, called the centre, are equal to each other. See GEOMETRY.

Circles of the Sphere, are such as cut the mundane sphere, and have their periphery either on its moveable surface, or in another immoveable, conterminous, and equidistant surface. See SPHERE. Hence arise two kinds of circles, *moveable* and *immoveable*. The first, those whose peripheries are in the moveable surface, and which therefore revolve with its diurnal mo-

tion; as, the *meridians*, &c. The latter having their periphery in the immoveable surface, do not revolve; as the *ecciptic*, *equator*, and its *parallels*, &c. See GEOGRAPHY.

CIRCLES of Altitude, otherwise called *almucantars*, are circles parallel to the horizon, having their common pole in the zenith, and still diminishing as they approach the zenith. See ALMUCANTAR.

Diurnal CIRCLES, are immoveable circles, supposed to be described by the seven stars, and other points of the heavens, in their diurnal rotation round the earth; or rather, in the rotation of the earth round its axis. The *diurnal circles* are all unequal: the equator is the biggest.

Horary CIRCLES, in dialing, are the lines which shew the hours on dials; though these be not drawn circular, but nearly straight. See DIALING.

CIRCLES of Latitude, or *Secondaries of the Ecciptic*, are great circles parallel to the plane of the ecciptic, passing through the poles thereof, and through every star and planet. They are so called, because they serve to measure the latitude of the stars, which is nothing but an arch of one of these circles intercepted between the star and the ecciptic. See LATITUDE.

CIRCLES of Longitude, are several lesser circles, parallel to the ecciptic; still diminishing, in proportion as they recede from it. On the arches of these circles, the longitude of the stars is reckoned.

CIRCLE of perpetual Apparition, one of the lesser circles, parallel to the equator; described by any point of the sphere touching the northern point of the horizon; and carried about with the diurnal motion. All the stars included within this circle never set, but are ever visible above the horizon.

CIRCLE of perpetual Occultation, is another circle at a like distance from the equator; and contains all those stars which never appear in our hemisphere. The stars situate between these circles, alternately rise and set at certain times.

Polar CIRCLES, are immoveable circles, parallel to the equator, and at a distance from the poles equal to the greatest declination of the ecciptic. That next the northern pole is called the ARCTIC; and that next to the southern one the ANTARCTIC.

Fairy CIRCLE. See FAIRY-CIRCLE.

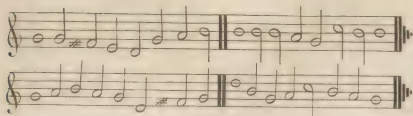
CIRCLE, in logic, or Logical CIRCLE, is when the same terms are proved in *orbem* by the same terms; and the parts of the syllogism alternately by each other, both directly and indirectly.

CIRCLES of the Empire, such provinces and principalities of the German empire as have a right to be present at diets. Maximilian I. divided the empire into fix, and some years after into ten circles. This last division was confirmed by Charles V. The circles, as they stand in the Imperial Matricula, are as follow: Austria, Burgundy, the Lower Rhine, Bavaria, Upper Saxony, Transania, Swabia, Upper Rhine, Westphalia, and the Lower Saxony.

CIRCUMCELLIONES, a species of fanatics, so called because they were continually rambling round the houses in the country. They took their rise among the donatists, in the reign of the emperor Constantine. It is incredible what ravages and cruelties these vagabonds committed in Africa through a long series of years.

Fig. 1.

The Notes of the 100 Psalm tune.



CHIMES.

Fig. 2.

*A Table for dividing the Chime
barrel of the 10 Psalm tune.*

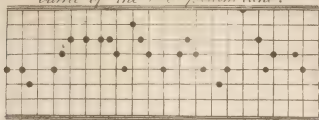


Fig. 3.

CIPHER.

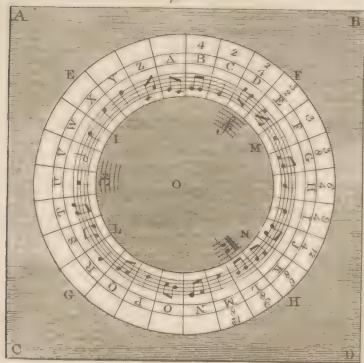
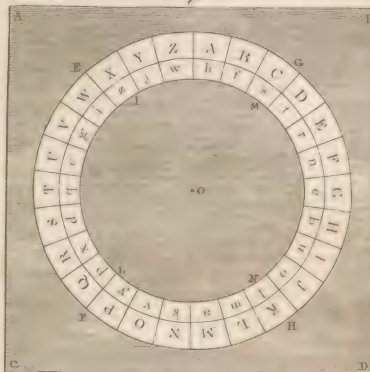
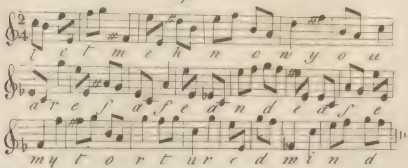


Fig. 1.



.Fig. 5.



.Fig. 6.

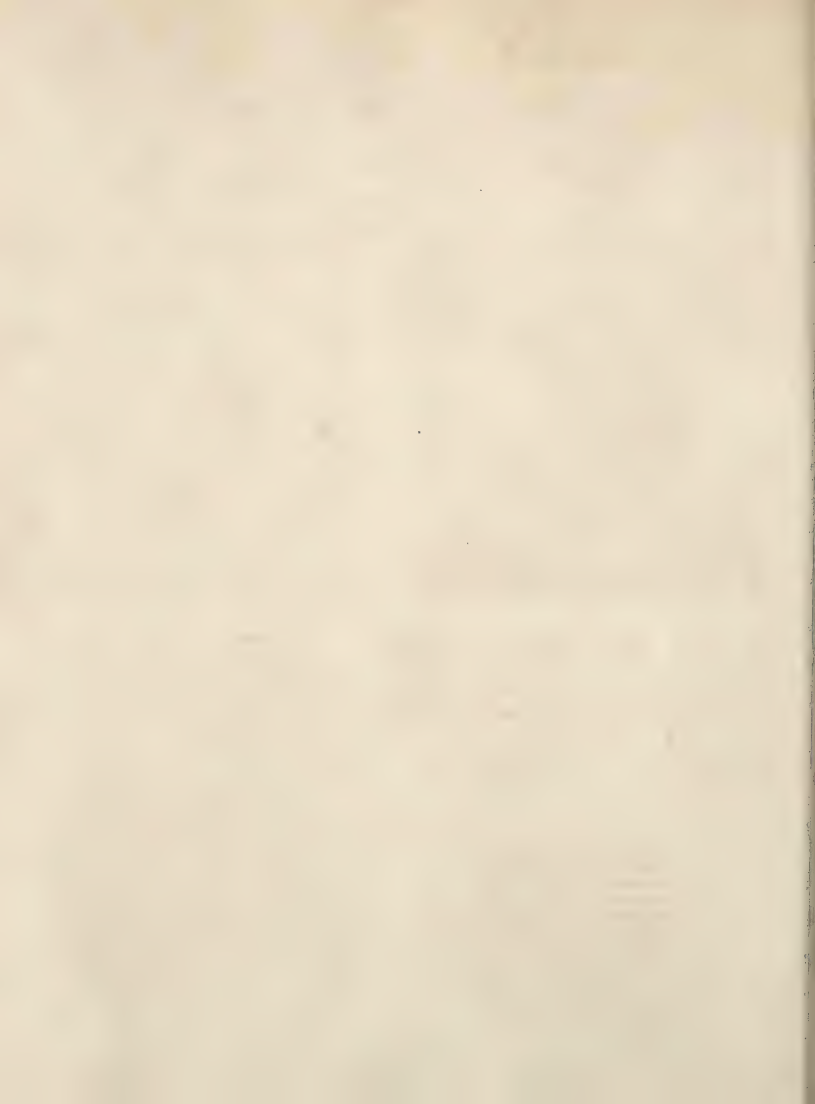
Ma un þvænum svar
vgru gu ed þvæ dænum
þvgr h yrkdavk hkt —
þvæ ahj dænum ahtr
h dæha vþvædugavk —

Fig. 8.

JE NO NC E U G U U E X E S T
 O D A U C X V X G V D V T D A O
 N O A O B C N V V I O O X E + V X
 + X A D O X U E X G U X S A U E
 X O N U G O X V + X L T O S O U T G
 V U S U E X E S T O G O O S E X
 C X V D L X L G O X H U S O X C
 G N O P T O V N + X O U P S O G
 N X + G L X V H U E N O N U E
 X O N C U U E G U X N U E X O E
 G O X T O S O T O X S O X T O L
 T N U X

i Fig. 7.

ΕΛΧΟΥ ΕΛΗΘΙ ΛΗΓΕΛΔ
 ΣΓΩ.ΓΕΓ+ΓΟ ΙΓΓΟ +
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years. They were illiterate, savage peasants, who understood only the Punic language. Intoxicated with a barbarous zeal, they renounced agriculture, professed continence, and assumed the title of "Vindicators of justice, and Protectors of the oppressed." To accomplish their mission, they enfranchised slaves, scourged the roads, forced masters to alight from their chariots, and run before their slaves, whom they obliged to mount in their place; and discharged debtors, killing the creditors if they refused to cancel the bonds. But the chief objects of their cruelty were the catholics, and especially those who had renounced donatism. At first they used no swords, because God had forbid the use of one to Peter; but they were armed with clubs, which they called the *clubs of Israel*; and which they handled in such a manner as to break a man's bones without killing him immediately, so that he languished a long time and then died. When they took away a man's life at once, they looked upon it as a favour. They became less scrupulous afterwards, and made use of all sorts of arms. Their shout was *Fraïse be to God*. These words in their mouths were the signal of slaughter, more terrible than the roaring of a lion. They had invented an unheard-of punishment; which was, to cover with lime diluted with vinegar, the eyes of those unhappy wretches whom they had crushed with blows, and covered with wounds, and to abandon them in that condition. Never was a stronger proof what horrors superstition can beget in minds destitute of knowledge and humanity. These brutes who had made a vow of chastity, gave themselves up to wine and all sorts of impurities, running about with women and young girls as drunk as themselves, whom they called *sacred virgins*, and who often carried proofs of their incontinence. Their chiefs took the name of *Chiefs of the Saints*. After having glutted themselves with blood, they turned their rage upon themselves, and sought death with the same fury with which they gave it to others. Some scrambled up to the tops of rocks, and cast themselves down headlong in multitudes; others burned themselves, or threw themselves into the sea. Those who proposed to acquire the title of martyrs, published it long before; upon which they were feasted and fattened like oxen for the slaughter; after these preparations they set out to be destroyed. Sometimes they gave money to those whom they met, and threatened to murder them if they did not make them martyrs. Theodorat gives an account of a stout young man, who meeting with a troop of these fanatics, consented to kill them, provided he might bind them first; and having by this means put it out of their power to defend themselves, whipped them as long as he was able, and then left them tied in that manner. Their bishops pretended to blame them, but in reality, made use of them to intimidate such as might be tempted to forsake their sect; they even honoured them as saints. They were not, however, able to govern those furious monsters; and more than once found themselves under a necessity of abandoning them, and even of imploring the assistance of the secular power against them. The counts Urfacius and Taurinus were employed to quell them; they destroyed a great number of them, of whom the

donatists made as many martyrs. Urfacius, who was a good catholic and a religious man, having lost his life in an engagement with the barbarians, the donatists did not fail to triumph in his death, as an effect of the vengeance of heaven. Africa was the theatre of these bloody scenes during a great part of Constantine's life.

CIRCUIT, in law, signifies a longer course of proceedings than is needful to recover the thing sued for.

CIRCUIT, also signifies the journey or progress, which the judges take twice every year, through the several counties of England and Wales, to hold courts and administer justice, where recourse cannot be had to the king's courts at Westminster: hence England is divided into six circuits, *viz.* the Home circuit; Norfolk circuit; Midland circuit; Oxford circuit; Western circuit, and Northern circuit. In Wales there are but two circuits, North and South Wales: two judges are assigned by the king's commission to every circuit.

In Scotland, the judges of the supreme criminal court, or court of judicatory, are divided into three separate courts, consisting of two judges each; and the kingdom into as many districts. In certain boroughs of every district, each of these courts by rotation are obliged to hold two courts in the year, in spring and autumn; which are called *circuit-courts*.

CIRCULAR, in a general sense, any thing that is described, or moved in a round, as the circumference of a circle, or surface of a globe.

CIRCULAR Numbers, called also *spherical ones*, according to some, are such whose powers terminate in the roots themselves. Thus, for instance, 5 and 6, all whose powers do end in 5 and 6, as the square of 5 is 25; the square of 6 is 36, &c.

CIRCULAR Sailing, is the method of sailing by the arch of a great circle. See **NAVIGATION**.

CIRCULATION, the act of moving round, or in a circle; thus we say, the circulation of the blood, &c.

CIRCULATION of the Blood, the natural motion of the blood in a living animal, whereby that fluid is alternately carried from the heart into all parts of the body, by the arteries, from whence it is brought back to the heart again by the veins. See **ANATOMY**, n° 387, 388, 389.

In a fetus, the apparatus for the circulation of the blood is somewhat different from that in adults. The septum, which separates the two auricles of the heart, is pierced through with an aperture, called the *foramen ovale*; and the trunk of the *pulmonary artery*, a little after it has left the heart, sends out a tube into the descending aorta, called the communicating canal. The fetus being born, the foramen ovale closes by degrees, and the canal of communication dries up, and becomes a simple ligament.

As to the velocity of the circulating blood, and the time wherein the circulation is completed, several computations have been made. By Dr Keil's account, the blood is driven out of the heart into the aorta with a velocity which would carry it twenty-five feet in a minute: but this velocity is continually abated in the progress of the blood, in the numerous sections or branches of the arteries, so that before it arrive at the

the extremities of the body, its motion is greatly diminished. The space of time wherein the whole mass of blood ordinarily circulates, is variously determined. Some state it thus: Supposing the heart to make two thousand pulses in an hour, and that at every pulse there is expelled an ounce of blood; is not ordinarily computed to exceed twenty-four pounds, it must be circulated seven or eight times over in the space of an hour.

The curious, in microscopic observations, have found an easy method of seeing the circulation of the blood in the bodies of animals: for these inquiries it is necessary to chuse such animals as are small, and easily manageable, and which are either wholly or in part transparent. The observations made by this means are preferable to any others we can have recourse to; since, in dissections, the animal is in a state of pain, or dying; whereas in animals small enough to be thus viewed, all is left in its usual course, and we see what nature does in her own undisturbed method. In these creatures also, after viewing, as long as we please, the natural state and current of the blood, we may, by pressure, and several other ways, impede its course; and by putting various mixtures into the creature's water, induce a morbid state, and finally see the creature die, either by means of this or by any other method; and we may thus accurately observe all the changes it undergoes, and see what occasions the trembling pulse, &c. of dying people.

The current of the blood in small animals, that is, its passing on through the vessels, either to or from the heart is very easily seen by the microscope; but its circulation, that is, its running to the extremities of the parts, and thence returning, is more difficult; because the vessels where this should be seen are so extremely minute, as not easily to come under observation. The larger arteries are easily distinguished from the veins by the motion of the blood through them, which, in the veins is always smooth and regular; but in the arteries by several propulsions after the manner of pulsation. But this difference is not to be found in the more minute vessels, in all which, as well arteries as veins, the motion of the blood is even and regular.

The transparent membrane, or web between the toes of a frog's hinder foot, is a very proper object to observe the circulation of the blood in. The tails, or fins of fishes, are also very fine objects, and when the fish is very small, these are manageable, and afford a view of a great number of veins and arteries, with a very quick and beautiful succession of blood through them. The tail of a flounder may be very conveniently placed before the double microscope on a plate of glass, and its body being supported by something of equal height the fish will lie still, and the circulation may be seen very agreeably. In the minutest vessels thus examined, the blood always appears pale or colourless, but in the large ones it is manifestly red. The arteries usually branch out extremely before they join the veins to carry the blood back to the heart; but this is not always the case; for Mr Leuwenhoeck has observed, that on each side of the little gillfish which give a stiffness to the tail of a flounder, there may be seen a very open communi-

cation of the veins and arteries; the blood running towards the extremities through arteries, and returning back again through veins, which were evidently a continuation of those arteries, and of the same diameter with them. The whole fish on the tail of which this examination was made, was not more than half an inch in length; it is easy to conceive, therefore, how small the tail must be; and yet in it there were 68 vessels which carried and returned the blood; and yet these vessels were far from being the most minute of all. How inconceivably numerous then must the *circulations* in the whole human body be? Mr Leuwenhoeck is of opinion, that a thousand different circulations are continually carried on in every part of a man's body in the breadth of a finger nail.

The tail of a newt or water-lizard affords also a very entertaining prospect of the circulation of the blood through almost numberless small vessels; but no object shews it so agreeably as one of these animals while so young as not to be above an inch long; for then the whole body is so very transparent, that the circulation may be seen in every part of it, as well as in the tail; and, in these objects, nothing is more beautiful than the course of the blood into the toes and back again, where it may be traced all the way with great ease. Near the head there are also found three small fins which afford a very delightful prospect: these are all divided like the leaves of polyphy; and in every one of the branches of these, the blood may be very accurately traced, running to the end through the artery, and there returning back again by a vein of the same size, and laid in the same direction; and as the vessels are very numerous and large in this part, and the third or fourth magnifier may be used, there are sometimes seen 30 or 40 channels of running blood at once; and this the more as the globules of blood in the newt are large, and are fewer in number, in proportion to the quantity of serum, than in any other animal; and their figure, as they are protruded through the vessels, changes in a very surprising manner. The impetus occasioning the circulation, is great enough in some animals to raise the blood six, seven, or eight feet high from the blood-vessel it springs out at; which, however, is far exceeded by that of the sap of a vine in bleeding time, which will sometimes rise forty feet high.

CIRCULATION of the Sap of Plants. See PLANTS, and SAP.

CIRCULATION of the Spirits, or Nervous Fluid. See ANATOMY, n° 400, h; and NERVOUS FLUID.

CIRCULATION, in chemistry, is an operation whereby the same vapour, raised by fire, falls back, to be returned and distilled several times.

CIRCULATION of Money. See COMMERCE, and MONEY.

Subterranean CIRCULATION. See SPRINGS.

CIRCULUS, in chemistry, an iron instrument in form of a ring, which being heated red hot, and applied to the necks of retorts and other glass vessels till they grow hot, a few drops of cold water thrown upon them, or a cold blast, will make the necks fly regularly and evenly off.

Another method of doing this, is to tie a thread, first

Circumam-
bient
↓
Circumci-
sion.

Circumci-
sion
↓
Circumfer-
rentor.

first dipt in oil of turpentine, round the place where you would have it break; and then setting fire to the thread, and afterwards sprinkling the place with cold water, the glass will crack exactly where the thread was tied.

CIRCUMAMBIENT, an appellation given to a thing that surrounds another on all sides; chiefly used in speaking of the air.

CIRCUMCELLIONES. See **CIRCONCELLIONES**.

CIRCUMCISION, the act of cutting off the prepuce; a ceremony in the Jewish and Mahometan religions, wherein they cut off the foreskin of their males, who are to profess the one or the other law.

Circumcision commenced in the time of Abraham; and was, as it were, the seal of a covenant stipulated between God and him. It was in the year of the world 2178, that Abraham, by divine appointment, circumcised himself, and all the males of his family; from which time it became an hereditary practice among his descendants.

The ceremony, however, was not confined to the Jews: Herodotus and Philo Judeus observe, that it obtained also among the Egyptians and Ethiopians. Herodotus says, that the custom was very ancient among each people; so that there was no determining which of them borrowed it from the other. The same historian relates, that the inhabitants of Colchis also used circumcision; whence he concludes, that they were originally Egyptians. He adds, that the Phœnicians and Syrians were likewise circumcised; but that they borrowed the practice from the Egyptians. And lastly, that a little before the time when he wrote, circumcision had passed from Colchis, to the people inhabiting near Thermoodon and Parthenius.

Marham is of opinion, that the Hebrews borrowed circumcision from the Egyptians; and that God was not the first author thereof; citing Diodorus Siculus, and Herodotus, as evidences on his side. This latter proposition seems directly contrary to the testimony of Moses, who assures, Gen. xvii. that Abraham, tho' 99 years of age, was not circumcised till he had the express command of God for it. But as to the former position of Marham, it will admit of more debate. The arguments on both sides may be seen in one view in *Spencer de Legibus Hebræorum*, l. 2. c. 4.

Be this as it will, it is certain the practice of circumcision among the Hebrews differed very considerably from that of the Egyptians. Among the first it was a ceremony of religion, and was performed on the eighth day after the birth of the child. Among the latter, a point of mere decency and cleanliness; and, as some will have it, of physical necessity; and was not performed till the 13th year, and then on girls as well as boys.

Among the Jews the time for performing this rite was the eighth day, that is, six full days, after the child was born: the law of Moses ordained nothing with respect to the person by whom, the instrument with which, or the manner how, the ceremony was to be performed; the instrument was generally a knife of stone. The child is usually circumcised at home, where the

father, or godfather, holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third person holds a porringer, with sand in it, to catch the blood; then the operator applies his mouth to the part, and, having sucked the blood, spits it into a bowl of wine, and throws a styptic powder upon the wound. This ceremony was usually accompanied with great rejoicings and feasting, and it was at this time that the child was named in presence of the company. The Jews invented several superstitious customs at this ceremony, such as placing three stools, one for the circumcisor, the second for the person who holds the child, and the third for Elijah, who, they say, assists invisibly at the ceremony, &c.

The Jews distinguished their proselytes into two sorts, according as they became circumcised or not: those who submitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moses; the uncircumcised were only bound to observe the precepts of Noah, and were called *noachidae*.

The Turks never circumcise till the seventh or eighth year, as having no notion of its being necessary to salvation. The Persians circumcise their boys at 13, and their girls from 9 to 15. Those of Madagascar cut the flesh at three several times; and the most zealous of the relations present, catches hold of the prepuce, and swallows it.

Circumcision is practised on women by cutting off the foreskin of the clitoris, which bears a near resemblance and analogy to the prepuce of the male penis. We are told that the Egyptian captive-women were circumcised; and also the subjects of Prester John.

CIRCUMCISION is also the name of a feast, celebrated on the first of January, in commemoration of the circumcision of our Saviour.

CIRCUMDUCTION, in Scots law. When parties in a suit are allowed a proof of allegiances; after the time limited by the judge for taking that proof is elapsed, either party may apply for circumduction of the time of proving; the effect of which is, that no proof can afterwards be brought, and the course must be determined as it stood when circumduction was obtained.

CIRCUMFERENCE, in a general sense, denotes the line or lines bounding a plane figure. However, it is generally used in a more limited sense, for the curve line which bounds a circle, and otherwise called a *periphery*; the boundary of a right-lined figure being expressed by the term *perimeter*.

CIRCUMFERENTOR, an instrument used by surveyors for taking angles.

It consists of a brass index and circle, all of a piece. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about seven inches. On this circle is made a chart, whose meridian line answers to the middle of the breadth of the index, and is divided into 360 degrees. There is a brass ring soldered on the circumference of the circle, on which screws another ring, with a flat glass in it, so as to form a kind of box for the needle, suspended on the pivot in the centre of the circle,

Circumflex
Circus.

Plate lxxiv.
fig. 7.

circle. There are also two fights to screw on, and slide up and down the index; as also a spangle and socket screwed on the back side of the circle for putting the head of the staff in.

How to observe the Quantity of an Angle by the Circumferentor. Let it be required to find the quantity of the angle EKG; first place your instrument at K, with the flower-de-luce of the chart towards you; then direct your sights to E, and observe what degrees are cut by the fourth end of the needle, which let be 296; then, turning the instrument about, direct your sights to G, noting then also what degrees are cut by the fourth end of the needle, which suppose 247. This done, always subtract the lesser from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

CIRCUMFLEX, in grammar, one of the ACCENTS.

CIRUMGYRATION, denotes the whirling motion of any body round a centre: such is that of the planets round the sun.

CIRCUMLOCUTION, a paraphractical method of expressing one's thoughts, or saying that in many words which might have been said in few.

CIRCUMPOLAR STARS, an appellation given to those stars, which, by reason of their vicinity to the pole, move round it without setting.

CIRCUMPOTATIO, in antiquity, a funeral feast provided in honour of the dead. This was very frequent among the ancient Romans, as well as among the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this custom, thinking it absurd that mirth and drunkenness should mingle with sorrow and grief.

CIRCUMSCRIBED, in geometry, is said of a figure which is drawn round another figure, so that all its sides or planes touch the inscribed figure.

CIRCUMSCRIPTION, in natural philosophy, the termination, bounds, or limits of any natural body.

CIRCUMSTANCE, a particularity which, though not essential to any action, yet doth some way affect it.

CIRCUMSTANTIBUS, in law, a term used for supplying and making up the number of jurors (in case any impanelled appear not, or appearing are challenged by any party,) by adding to them so many of the persons present as will make up the number, in case they are properly qualified.

CIRCUMVALLATION, or *Line of Circumvallation*, in the art of war, is a trench bordered with a parapet, thrown up quite round the besieger's camp, by way of security against any army that may attempt to relieve the place, as well as to prevent desertion.

CIRCUMVOLUTION, in architecture, denotes the torus of the spiral line of the Ionic volute.

CIRCUS, in antiquity, a great building of a round or oval figure, erected by the ancients, to exhibit shews to the people. See *Circensian Games*.

The Roman circus was a large oblong edifice, arched at one end, encompassed with porticoes, and furnished with two rows of seats, placed ascending over each other. In the middle was a kind of foot-bank,

or eminence, with obelisks, statues, and posts at each end. This served them for the courses of their bigae and quadrigae.

Those that have measured the circus say, that it was 2187 feet long, and 960 broad; so that it was the greatest building in Rome: some say it would contain 150,000 people, other 260,000, or 300,000.

CIRENCESTER, an ancient town of Gloucestershire in England. It was strongly fortified with walls and a cattle in the time of the Romans. The ruins of the walls and street are, or were lately, to be seen in the adjacent meadows, where many Roman coins, chequered pavements, and inscriptions on marble, have been found. Two of the Roman consular ways cross each other at this town. The off-ways, which comes from Scotland, passes through this county and town to Totnes in Devonshire. The other, called *Irmis-street*, comes from Gloucester, and runs along to Southampton. Not many years ago they discovered, by digging in a meadow near the town, an ancient building under ground, 50 feet long, 40 broad, and 4 high, and supported by 100 brick pillars, curiously inlaid with stones of various colours, supposed to have been a Roman bath. Cirencester has now but one church, in the windows of which are the remains of very valuable painted glass. The town is governed by 2 high constables, and 14 wards-men, who govern 7 distinct wards; and it sends two members to parliament. It has a free-school, a charity-school, with several almshouses; and is seated on the river Churn, 36 miles north-east of Bristol, and 88 west by north of London. W. Long. 2° . 2. N. Lat. 51° . 42.

CIRENZA, a city of Naples, capital of the Basilicate, with an archbishop's see. It was formerly a considerable place, but is now of small consequence. It is seated on the river Brandano, at the foot of the Appennine mountains, in E. Long. 16. 44. N. Lat. 40° . 48.

CIRO-FERRI, an excellent Italian painter and architect, was born at Rome in 1614, and was the disciple of Peter de Cortona, whose designs he imitated with such exactness, that it is difficult to distinguish them. He was esteemed by pope Alexander VII. and his three successors, and died at Rome in 1689.

CIRRUS, or **CIRRUS**, in botany, a clasper or tendril; that fine spiral string or fibre put out from the foot-stalks, by which some plants, as the ivy and vine, fasten themselves to walls, pales, or trees, for support. The term is synonymous to the capreolus, clavicular, and viticulus of other botanists; and is ranked by Linnaeus among the fulcra, or parts of plants that serve for protection, support, and defence.

Tendrils are sometimes placed opposite to the leaves, as in the vine; sometimes at the side of the foot-stalk of the leaf, as in passion-flower; and sometimes, as in winged pea, *pisum ocheus*, they are emitted from the leaves themselves. With respect to composition, they are either simple, that is, composed of one fibre or chord, as in the vetch; or compound, that is, consist of two, three, or more, as in the everlasting pea. Bitter sweet, solanum, dukamara, bignonia, and ivy, send forth tendrils which plant themselves like roots

Cirencester
Circus.

Cirri
Ciffoid.

in the adjacent walls, or the bark of the neighbouring trees. Claspers, says the ingenious Dr Grew, are like trunk-roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circinvolutions, in which they mutually ascend and descend. In the mounting of the trunk, continues the same author, claspers serve for support. Thus, in vines, the branches being very long, fragile and slender, would be liable to frequent breaking, unless, by means of their claspers, they were mutually contained together; so that the whole care is divided betwixt the gardener and nature: the former, with his ligaments of leather, secures the main branches; and nature, with those of her own providing, secures the lefs. Their aptitude to this end is seen in their convolutions, a motion not proper to any other-part: and also in their toughness, which is so much the more remarkable, as they are slenderer than the branches from which they proceed. In the trailing of the trunk, tendrils serve for stabilitment and shade: thus, in cucumbers, the trunk and branches being long and fragile, would be driven to and fro, by the winds, to the great prejudice both of themselves and their tender fruits, were they not, by these ligaments, held fast together, and preserved in association and good fellowship. The same claspers serve likewise for shade: so that a natural arbour is formed by the branches of the cucumber, in the same manner as an artificial one is made by tangling together the twigs of trees; for the branches, by the linking of their claspers, being couched together, the tender fruits lie under the umbrage of a bower made of their own leaves. Molt of the pea-bloom flowers have twining claspers, that is, which wind to the right and back again.

CIRRI, in ichthyology, certain oblong and soft appendages, not unlike little worms, hanging from the under jaws or mouths of some fishes: these cirri, commonly translated *beards*, afford marks to distinguish the different species of the fishes on which they are found.

CISALPINE, any thing on this side the Alps. The Romans divided Gaul and the country now called Lombardy, into Cisalpine and Transalpine. That which was Cisalpine with regard to the Romans, is Transalpine with regard to us.

CISLEU, in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil, year, answering nearly to our November.

CISSAMPELOS, in botany, a genus of the monogynia order, belonging to the dioecia class of plants. There are two species, the pareina and caepeba, both natives of the warmest parts of America. The root of the second, applied externally, is said to be an antidote against the bites of venomous serpents. The plant being infused in water, quickly fills the liquor with a mucilaginous substance, which is as thick as jelly; whence the name of *freezing-lyth*, by which this genus of plants has been distinguished by the Brazilians.

CISSOID, in geometry, a curve of the second order, first invented by Diodes, whence it is called the *ciffoid of Diodes*. See FLUXIONS.

CISSUS, the WILD-GRAPE, a genus of the mono-

gynia order, belonging to the tetrandria class of plants. There are four species, all of them natives of the island of Jamaica, and some of the other islands in the warm parts of America. They send out slender branches, having tendrils at their joints, by which they falten to the neighbouring trees, bushes, and any other support, mounting to a considerable height. The fruit of some of the species are eaten by the negroes.

CISTERCIANS, in church-history, a religious order founded in the 11th century by St Robert, a benedictine. They became so powerful, that they governed almost all Europe, both in spirituals and temporals. Cardinal de Vitri describing their observances, says, they neither wore skins nor shirts; nor ever eat flesh, except in sickness; and abstained from fill, eggs, milk, and cheese: they lay upon straw-beds, in tunics and cowls: they rose at midnight to prayers: they spent the day in labour, reading and prayer: and in all their exercises observed a continual silence. The habit of the cistercian monks is a white robe, in the nature of a cassock, with a black scapulary and hood, and is girt with a wooden girdle. The nuns wear a white tunic, and a black scapulary and girdle.

CISTERN, denotes a subterranean reservoir of rain-water; or a vessel serving as a receptacle for rain or other water, for the necessary uses of a family. There are likewise lead-cisterns, jar-cisterns, &c.

Authors mention a cistern of Constantinople, the vaults of which are supported by two rows of pillars, 212 in each row, each pillar being two feet in diameter. They are planted circularly, and *in radii* tending to that of the centre.

Anciently there were cisterns all over the country in Palestine. There were some likewise in cities and private houses. As the cities for the most part were built on mountains, and the rains fell regularly in Judea at two seasons in the year only, in spring and autumn, people were obliged to keep water in cisterns in the country for the use of their cattle, and in cities for the convenience of the inhabitants. There are still cisterns of very large dimensions to be seen in Palestine, some whereof are 150 paces long, and 54 wide. There is one to be seen at Ramah of 32 paces in length, and 28 in breadth. Wells and cisterns, springs and fountains, are generally confounded in scripture-language.

CISTUS, the ROCK-ROSE; a genus of the monogynia order, belonging to the polyandria class of plants. There are 37 species, most of them natives of the southern parts of Europe, but hardly enough to bear the open air in this country. They are beautiful evergreen shrubs, generally very branchy quite from the bottom, and forming diffused heads. They are very ornamental in gardens, not only as evergreens, making a fine variety at all seasons with their leaves of different figures, sizes, and shades of green and white, but also as first-rate flowering shrubs, being very profuse in most elegant flowers of white, purple, and yellow colours. These flowers only last for one day; but there is a continual succession of new ones for a month or six weeks on the same plant; and when there are different species, they will exhibit

Cisterciens
Cistus.

Citadel
Citizen.

exhibit a constant bloom for near three months. They are propagated either by seeds or cuttings, and thrive best in a dry soil. Their proper situation in shrubbery works should be towards the front of the clumps and other compartments, in assemblage with the choicest shrubs of similar growth, disposing them so as to make a variety, and to have shelter from the other plants; but they ought by no means to be crowded. Gum labdanum is found upon a species of citrus which grows naturally in the Levant, and is therefore called *ladanifera*. See LABDANUM.

CITADEL, a place fortified with five or six bastions, built on a convenient ground near a city, that it may command it in case of a rebellion.

CITADELLA, the capital town in the island of Minorca, in the Mediterranean, with a new harbour. This, with the whole island, were taken by general Stanhope and the confederate fleet in 1708, and ceded to Great Britain by the treaty of Utrecht in 1713; but it was taken by the French, after a brave defence, in 1756; and restored by the peace. It is 27 miles west of Port-Mahon. E. Long. 3. 30. N. Lat. 39. 58.

CITADINESCA, in natural history, a name given by some writers to the Florentine marble, which is supposed to represent towns, palaces, ruins, rivers, &c. These delineations are merely accidental, and are commonly much assisted by the imagination, though the natural lines of a stone may sometimes luckily enough represent the ruins of some ancient building, or the course of a river. In England there is a kind of septaria, or ludus Helmontii, which has sometimes pretty beautiful, though very irregular, delineations of this kind. The Florentine marble, as we see it wrought up in the ornaments of cabinets, &c. owes a great deal to the skill of the workmen, who always pick out the proper pieces from the mass, and dispose them in the work so as to represent what they please.

CITATION, in ecclesiastical courts, is the same with summons in civil courts. See SUMMONS.

CITATION, is also a quotation of some law, authority, or passage of a book.

CITHARA, in antiquity, a musical instrument, the precise structure of which is not known; some think it resembled the Greek delta Δ ; and others, the shape of a half moon. At first it had only three strings, but the number was at different times increased to 8, to 9, and lastly to 24. It was used in entertainments and private houses, and played upon with a plectrum or quill, like the lyre.

CITHAREXYLON, FIDDLE-WOOD; a genus of the angiosperma order, belonging to the didymia class of plants. There are two species, both natives of the warm parts of America, where they grow to be large trees, and are adorned with white flowers growing in spikes. In Britain they appear only as shrubs, and must be constantly retained in the stove, where they make a fine appearance, being beautiful evergreens. They may be propagated either by seeds or cuttings.

CITIZEN, a native or inhabitant of a city, vested with the freedom and liberties of it.

A citizen of Rome was distinguished from a stranger, because he belonged to no certain commonwealth subject to the Romans. A citizen is either by birth

or election; and sons may derive the right from their fathers. To make a good Roman citizen, it was necessary to be an inhabitant of Rome, to be enrolled in one of the tribes, and to be capable of dignities. Those to whom were granted the rights and privileges of Roman citizens, were only honorary citizens. It was not lawful to scourge a citizen of Rome.

CITRINUS, in natural history, the name of a peculiar species of sprig crystal, which is of a beautiful yellow. Many of the common crystals, when in the neighbourhood of lead-mines, are liable to be accidentally tinged yellow, by an admixture of the particles of that metal; and all these, whether finer or coarser, have been too frequently confounded together under the name *citrine*; but Dr Hill has ascertained this to be a peculiar species of crystal different from all the others in form as well as in colour; and distinguished by the name of *ellipsonacrossylum lucidum flavescens, pyramidæ brevis*. It is never found colourless like the other crystals, but has great variety of tinges, from that of the deeper ochres, to a pale lemon-colour. It is very plentiful in the West Indies, and is sometimes found in Bohemia. Our jewellers have learned from the French and Italians, who are very fond of it, to call it *citrine*; and often cut stones for rings out of it, particularly out of the pyramid, which is always finer than the column, and these, after they have passed through two or three hands, are generally mistaken for topazes.

CITRON-TREE, in botany. See CITRUS.

CITRON-Water, a well-known strong water or cordial, which may be thus made: Take of fine thin lemon-peel, 18 ounces; of orange-peel, 9 ounces; perfect nutmegs, 4 ounces; the finest and best rectified spirit of wine, 2 gallons and a half. Digest in balneo mariæ for one night: draw off with a slow fire: then add as much water as will just make the matter milky (which will be about 7 quarts or 2 gallons); and lastly, add 2 pounds of fine sugar. This composition may be improved by fresh elder flowers, hung in a cloth in the head of the still, sprinkled with ambergrace in powder, or its essence.

CITRON-Wood, the wood of an American tree, called by the natives *candle-wood*; because, being cut into splinters, it burns like a candle. The tree is frequent in the Leeward Islands, and grows to a considerable size: the leaves are like those of the bay-tree, but of a finer green; the flower is sweet, and much like those of the orange; the fruit succeeding these is black, and of the size of a pepper-corn. The trunk is so like the yellow Saunders in colour, that there was once an opinion that it was the same tree, and much of it was imported into Europe, and sold as such: but they were soon found to be different; the Saunders being of a sweet scent, and but moderately heavy and resinous; but the citron-wood considerably heavy, very oily, and of a strong smell. It is of no known use in medicine; but is used in France and Germany by the turners, being a fine firm-grained wood, and taking a fine polish, and with age becoming of a very beautiful brown.

CITRUS, the CITRON-TREE, a genus of the icofandria order, belonging to the polyadelphia class of plants.

Citrus
Citrus.

Species I. The Medica, or Citron-tree, hath an upright smooth trunk, divided at top into a branchy strong-shooting, full head, from about five to 15 feet high, adorned with large oval, spear-shaped, thick leaves, having linear foot-stalks, and numerous flowers from the sides of the branches, succeeded by very large oblong oval, pointed, rough-rinded fruit. The varieties are citron-tree with four fruit; with sweet fruit; with long fruit; with warted fruit; with recurved fruit; and with blotched leaves.

II. *The Lima, or Lemon-tree*, hath an upright smooth trunk, divided upward into a branchy regular head; from 12 to 15 feet high; large, oval, spear-shaped, pointed, slightly sawed leaves, on linear foot-stalks; and many flowers from the sides of the branches succeeded by large oval fruit prominent at the top. The varieties are, the lemon-tree with four fruit; with sweetish fruit; with very large fruit called Imperial lemon; with pear-shaped fruit; with furrowed fruit; with clustered fruit; with chinking fruit; with whitish fruit; with tricolor striped fruit; with silver striped leaves; and with double flowers.

III. *The Aurantium, or Orange-tree*, hath an upright trunk dividing upward into a branchy, regular head, from five to 10 or 12 feet high; oval, spear-shaped, entire leaves, having winged foot-stalks and numerous white flowers at the sides of the branches, succeeded by globular fruit compressed at both ends. The most noted varieties are, 1. *The Seville orange*. This is a very handsome tree, and the hardiest of any; as in this country it shoots freely, produces large and beautiful leaves, flowers stronger, &c. The fruit is large, rough rinded, and four, of excellent quality for economical uses. 2. *The China orange*. This tree has moderately sized leaves, and a smooth, thin-rinded, sweet fruit, of which there are several varieties in warm countries, where they grow in the open ground. 3. *The great Shaddock orange, or pumplemoos*, grows larger and stronger than the foregoing, with large, thick and somewhat serrated leaves, and very large fruit, having a reddish pulp. It derives the name of Shaddock from one of that name that first brought it from the East Indies. 4. *The Horned orange* is a tree of moderate size, producing fruit which divide, and the rind runs out into divisions like horns. 5. *The Hermaphrodite orange* is a common sized tree, producing fruit shaped partly like an orange and partly like a citron. 6. *The Dwarf orange tree, or nutmeg orange*, has a long stem and small bushy head, growing two or three feet high; small oval leaves in clusters; and numerous flowers in clusters, covering the branches, succeeded by very small fruit. These are the most remarkable varieties of the three foregoing species of citrus: but besides these there are a great number of others; and indeed, in those countries where they grow naturally, the varieties may be multiplied without end, like those of our apples and pears. The flowers of all the species and varieties are formed each of five spreading petals, appearing here principally in May and June; and the fruit continue setting in June and July, and ripen the year following.

IV. *The Trifoliata, or Japonice citron*, is a thorny shrub growing naturally in Japan, where it is likewise known by the names of Gces, and Karats banna.

The trunk, we are told by Kæmpfer, acquires by age and culture the thickness of a tree. The branches and shoots are unequal; in some parts compressed, in others swelling, especially about the spines. These proceed singly from the stem and branches; are straight, run out from a broad base into a very sharp point; and are protruded from the wood, with the common bark of which they are likewise invested. The wood is loose and soft; the bark of a shining green, moist, and easily parting from the wood. The leaves are few in number, fewed on the edges, veined, placed without order, but generally growing under the spines. They grow by threes, like those of trefoil, upon the extremity of a common foot-stalk which is furnished on each side with a membranaceous fringe or margin, somewhat resembling the pedicles of the orange. The upper surface of the leaves is of a bright lucid green, the lower dark and herbaceous. The flowers which resemble those of the medlar, proceed singly from the arm-pits of the leaves; are white, possessed of no great degree of fragrance, and consist of five petals. The fruit is equally beautiful with a middle sized orange; their internal structure is also pretty much the same; only the pulp is glutinous, of an unpleasant smell, and a harsh disagreeable taste. The seeds have the same taste with the pulp, and are shaped exactly like those of the orange.

Culture. The three first species merit particular attention. They are elegant evergreens, rising in this country from about five to 10 feet in height; forming full and handsome heads, closely garnished with beautiful large leaves all the year round, and putting forth a profusion of sweet flowers in spring and early in summer; which even in this climate are often succeeded by abundance of fruit that sometimes arrive at tolerable perfection. Though all the varieties were originally obtained by seed, yet the only certain method of continuing the approved varieties is by budding or inarching them on stocks raised from seed to a proper size. As the young trees, however, are brought in plenty from abroad, this method is seldom practised in this country: but for curiosity, it may be done by those who are so inclined, in the following manner: Early in the spring procure some kernels, which may be had in plenty from rotten fruits, or others that are properly ripened, observing that for stocks, the citron, lemon, and Seville-orange, as being the sweetest shooters are to be preferred; and of these the citron is the strongest. Sow the kernels in March, in pots of rich light earth half an inch deep, and plunge them in a hot-bed under frames and glasses. Dung or tan may be used, but the latter is preferable, giving air, and frequent sprinklings of water. In two or three weeks the plants will come up, and in six or eight weeks more; they will be advanced four or five inches or more in height. You must now give them more air and water; and about the middle of June harden them to the full air, in which let them remain till October; then move them into the green house, to stand till the spring, and in March or April, plant them singly in small pots; being careful to shake them out of the seed pots with their roots entire. They must be watered immediately after planting, and the watering must be occasionally repeated. After this they are to be treated

Citrus.

ed as woody exotics of the green-house; and in a year or two the largest of those designed for stocks will be fit for budding.

* See *Inoculation*.

The operation for budding is performed in the month of August, and is done in the common way*; only the buds must be taken from trees of a good kind that bear well. As soon as the operation is finished, the pots with their plants must be placed in the green-house, or in a glass case; or, where there is the convenience of a spare bark-pit, where the heat of the bark is almost exhausted, the pots may be plunged therein for two or three weeks. In either case, however, the air must be admitted freely by opening the front glasses; allowing also a slight shade of mats in the middle of hot sunshine days, and supplying them with water every two or three days during this kind of weather. In three or four weeks the buds will be united with the stock; when it will be proper to loosen the bandages that they may have room to swell; the buds, however, will all remain dormant till the next spring. They may also be propagated by inarching, which is done in the common way†; but the method

† See *Inarching*.

of budding is found to produce much handomer trees, and therefore is to be preferred. But the most cheap and expeditious method of procuring a collection of these kinds of trees is by having recourse to such as are imported from Spain, Italy, and Portugal. These come over in chests, without any earth to their roots, having their roots and heads a little trimmed; they are commonly from one inch to two or three in diameter in the stem; from two to four or five feet in height; and by the assistance of a bark-bed they readily take root and grow freely; forming as good trees in two years, as could be raised here by inarching or budding, in 15 or 20. They are sold in the Italian ware-houses in London; the principal one of which has been for many years in the Hay-market near the bottom, Pall Mall: their price is from three shillings to a guinea each, according to their size; and they are generally advertised as soon as they arrive, which is early in the spring, and the sooner the better. In the choice of these trees it must be observed, that they are commonly budded at such height in the stem, as to form heads from about two to four or five feet high, and as they are frequently furnished with two buds, one on each side of the stem, these should be chosen preferably to others; as they will form the most regular heads. Preparatory to their planting, they must be placed for a day or two in tubs of water to plump their bark and roots; after this they must be washed and cleaned, their branches trimmed to half a foot long, and the roots freed from diseased parts, and all the small dried fibres. Then they are to be planted in pots filled with light rich earth; and plunged in a tan-bed, where they are to remain for three or four months; after which they are to be trained to the open air, but will not bear it longer than from the end of May till the middle or end of October.

Sometimes these trees, instead of being kept in pots or tubs, are planted in the full ground; and where this can be done, it is by far the most eligible method. Where this is intended, there must be frames erected for the support of glass and other covers, to defend the plants during inclement weather; and in this situa-

tion the trees generally shoot strong, produce large fruit, and may be trained either as wall, or standard trees. A south wall, in a dry situation is proper for training them as wall-trees; against which may be erected wooden frame work sloping, either fixed or moveable, for the support of glass frames for winter; likewise for the greater protection of the trees in severe frosts, there may be a fire-place with a flue or two carried along it a low wall, in the front and ends. To have the trees as standards, a more capacious and lofty glass-case should be erected against the wall in the manner of a hot-house, but higher; in this one or two rows of orange-trees may be planted, suffering to run up as standards with only some necessary pruning just to preserve their regularity. In some places there are lofty moveable glass-cases, so that two or three rows of trees are planted in a conspicuous part of the pleasure ground. In winter the frame is put over them, and in summer wholly taken away; so that they appear like a little orange-grove growing in the open ground. The flowering and fruit setting season of all the sorts of citrus is in June and July. They are often, especially the orange-trees, greatly loaded with blossoms; and when these stand very thick, it is proper to thin them a little, taking off the smallest. It is also to be observed, that as the trees continue blowing and setting their fruit for three months, when a full crop of fruit is set, it is of benefit to the trees and fruit, to gather off the superabundant blossoms as they are produced; though some permit them to remain on account of their appearance.

Uses. The fruits of the citron, lemon, and orange trees, yield very agreeable acid juices; which, besides the uses to which they are commonly applied, answer considerable purposes in medicine. When commodore Anson sailed round the world, his men were so surprisingly recovered from the scurvy by the oranges which they found at the island of Tinian, that it was afterwards thought worthy of the attention of government to inquire into the virtues of these fruits as an antiscorbutic medicine. In captain Cook's last voyage, he was supplied with a quantity of orange and lemon juice inspissated to a rob; but his opinion of its efficacy is by no means great. The dearth of it is a great objection; and unless in conjunction with other things, he has not observed its good effects. Sir John Pringle, in his discourse before the Royal Society, when captain Cook was presented with a medal by that respectable body, differs a little from the captain's opinion, and thinks that in the sea-scurvy these fruits must necessarily be very efficacious. He approves, however, more of the juices themselves depurated, than the extract of them; as this cannot be prepared without dissipating many of the finer parts. The juice of lemons is very frequently used for neutralising alkaline salts for saline draughts. The citron is seldom used in this country; though its peel, as well as that of the lemon, is candied, and sold as a sweetmeat. The yellow peel of the lemon is an agreeable aromatic, as is also that of the orange; and in cold plethoric constitutions they prove excellent stomachics and carminatives, promoting appetite, warming the habit, and strengthening the tone of the viscera.

Orange-

Citrus.

Cittern
City.

Orange-peel, however, is very considerably warmer than that of lemons, and abounds more in essential oil: to this circumstance therefore due regard ought to be had in the use of these medicines. The flavour of orange peel is likewise less perishable than that of lemons. Both are ingredients in many official preparations.

The young fruit of the Seville orange dried, are used in medicine under the name of *aurantia curassavensis*. They are moderately warm-bitterish aromatics, of a sufficiently agreeable flavour. The flowers of the orange-tree have been for some time past in great esteem as a perfume. They are highly odoriferous, of a somewhat warm and bitter taste. They yield their flavour by infusion to rectified spirit, and in distillation both to spirit and water: the bitter matter is dissolved in water, and on evaporating the decoction remains entire in the extract. The distilled water was formerly kept in the shops, but on account of the great scarcity of the flowers is now laid aside: it is called by foreign writers *aqua naphæ*. An oil distilled from these flowers, is brought from Italy under the name of *oleum, or essentia neroli*.

CITTERN, a musical instrument much resembling the guitar, for which it has been frequently mistaken. Anciently it was called the *cistrum*, and till lately was held in great contempt both in France and Britain. The practice on it being very easy, it was formerly the amusement and recreation of lewd women and their visitors; inasmuch, that in many of the old English dramatic writers, it is made the symbol of a woman that lived by prostitution. It was also the common amusement of waiting customers in barber's shops, as being the most easy of all instruments to play on, and therefore it was thought that almost every body could make use of it.

CITY, according to Cowel, is a town corporate which hath a bishop and cathedral church; and is called *civitas, oppidum, and urbs*: *civitas*, in regard it is governed by justice and order of magistracy; *oppidum*, because it contains a great number of inhabitants; and *urbs*, because it is in due form surrounded with walls.

Kingdoms have been said to contain as many cities as they have seats of archbishops and bishops: but, according to Blount, *city* is a word that hath obtained since the conquest; for, in the time of the Saxons, there were no cities, but all the great towns were called *burghs*, and even London was then called *Edinburgh*, as the capital of Scotland is called *Edinburgh*. And long after the conquest the word *city* is used promiscuously with the *burgh*, as in the charter of Leicester, where it is both called *civitas* and *burgus*; which shews that those writers were mistaken who tell us every city was, or is, a bishop's see. And though the word *city* signifies with us such a town corporate as hath usually a bishop and a cathedral church, yet it is not always so.

As to the ancient state of cities and villages, whilst the feudal policy prevailed, they held of some great lord on whom they depended for protection, and were subject to his arbitrary jurisdiction. The inhabitants were deprived of the natural and most unalienable rights of humanity. They could not dispose of the

effects which their own industry had acquired, either by a latter-will or by any deed executed during their life. They had no right to appoint guardians for their children during their minority. They were not permitted to marry without purchasing the consent of the lord on whom they depended. If once they had commenced a law-suit, they durst not terminate it by an accommodation, because that would have deprived the lord, in whole court they pleaded, of the perquisites due to him on passing his sentence. Services of various kinds no less disgraceful than oppressive were exacted from them without mercy or moderation. The spirit of industry was checked in some cities by absurd regulations, and in others by unreasonable exactions: nor would the narrow and oppressive maxims of a military aristocracy have permitted it ever to rise to any degree of height or vigour.

Robertson's
Charles V.

The freedom of cities was first established in Italy, owing principally to the introduction of commerce. As soon as they began to turn their attention towards this object, and to conceive some idea of the advantages they might derive from it, they became impatient to shake off the yoke of their insolent lords; and to establish among themselves such a free and equal government as would render property secure, and industry flourishing. The German emperors, especially those of the Franconian and Svanian lines, as the seat of their government was far distant from Italy, possessed a feeble and imperfect jurisdiction in that country. Their perpetual quarrels, either with the popes, or their own turbulent vassals, diverted their attention from the interior police of Italy, and gave constant employment for their arms. These circumstances induced some of the Italian cities, towards the beginning of the 11th century, to assume new privileges; to unite together more closely; and to form themselves into bodies politic, under the government of laws established by common consent. The rights which many cities acquired by bold or fortunate usurpations, others purchased from the emperors, who deemed themselves gainers when they received large sums for immunities which they were no longer able to withhold; and some cities obtained them gratuitously from the facility or generosity of the princes on whom they depended. The great increase of wealth which the Crusades brought into Italy, occasioned a new kind of fermentation and activity in the minds of the people, and excited such a general passion for liberty and independence, that, before the conclusion of the last crusade, all the considerable cities in that country had either purchased or had extorted large immunities from the emperors.

This innovation was not long known in Italy before it made its way into France. Louis the Great, in order to create some power that might counterbalance those potent vassals who controlled or gave law to the crown, first adopted the plan of conferring new privileges on the towns situated within his own domaine. These privileges were called *charters of community*, by which he enfranchised the inhabitants, abolished all marks of servitude, and formed them into corporations or bodies politic, to be governed by a council and magistrates of their own nomination. These magistrates had the right of administering justice

City.

tice within their own precincts; of levying taxes; of embodying and training to arms the militia of the town, which took the field when required by the sovereign, under the command of officers appointed by the community. The great barons imitated the example of their monarch, and granted like immunities to the towns within their territories. They had wasted such great sums in their expeditions to the Holy Land, that they were eager to lay hold on this new expedient for raising money, by the sale of those charters of liberty. Though the constitution of communities was as repugnant to their maxims of policy as it was adverse to their power, they disregarded remote consequences in order to obtain present relief. In less than two centuries, servitude was abolished in most of the cities of France, and they became free corporations, instead of dependent villages without jurisdiction or privileges. Much about the same period the great cities of Germany began to acquire like immunities, and laid the foundations of their present liberty and independence. The practice spread quickly over Europe, and was adopted in Spain, England, Scotland, and all the other feudal kingdoms.

The Spanish historians are almost entirely silent concerning the origin and progress of communities in that kingdom; so that it is impossible to fix with any degree of certainty the time and manner of their first introduction there. It appears, however, from Mariana, that in the year 1350 eighteen cities had obtained a seat in the Cortes of Castile. In Aragon, cities seem early to have acquired extensive immunities together with a share in the legislature. In the year 1118, the citizens of Saragossa had not only attained political liberty, but they were declared to be of equal rank with the nobles of the second class; and many other immunities, unknown to persons in their rank of life, in other parts of Europe were conferred upon them. In England the establishment of communities or corporations was posterior to the conquest. The practice was borrowed from France, and the privileges granted by the crown were perfectly similar to those above enumerated. It is not improbable that some of the towns in England were formed into corporations under the Saxon kings, and that the charters, granted by the kings of the Norman race, were not charters of enfranchisement from a state of slavery, but a confirmation of privileges which they had already enjoyed.* The English cities, however, were very inconsiderable in the 12th century. A clear proof of this occurs in the history just referred to. Fitz-Stephen, a contemporary author, gives a description of the city of London in the reign of Henry II. and the terms in which he speaks of its trade, its wealth, and the number of its inhabitants, would suggest no inadequate idea of its state at present, when it is the greatest and most opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flourished in the same reign, and who had good opportunity of being informed, that this city, of which Fitz-Stephen gives such a pompous account, contained no more than 40,000 inhabitants. The other cities were small in proportion, and in no condition to extort any extensive privileges. That

the constitution of the boroughs of Scotland, in many circumstances resembled that of the towns of France and England, is manifest from the *Leges Burgorum*, annexed to the *Regiam Majestatem*.

CIVET, a kind of perfume which bears the name of the animal it is taken from, and to which it is peculiar. See VIVERRA.

Good civet is of a clear, yellowish, or brownish colour; not fluid nor hard, but about the consistence of butter or honey, and uniform throughout; of a very strong smell, quite offensive when undiluted, but agreeable when only a small portion of civet is mixed with a large one of other substances. It unites easily with oils both expressed and distilled, but not at all with water, or spirit of wine: nor can it be rendered miscible with water by the meditation of sugar. The yolk of an egg seems to dispose it to unite with water; but in a very little while the civet separates from the liquor and falls to the bottom, tho' it does not prove of such a resinous tenacity, as when treated with sugar and spirit of wine. It communicates, however, some share of its smell both to watery and spirituous liquors: hence a small portion of it is often added in odoriferous tinctures, and suspended in the still-head during the distillation of odoriferous waters and spirits. It is rarely, if ever employed for medicinal purposes. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its scent; for oils wholly dissolve the substance of it. It is very rare, however, to meet with civet unadulterated. The substances usually mixed with it are lard and butter; which agreeing with it in its general properties, render all criteria for distinguishing the adulteration impossible. A great trade of civet is carried on at Calicut, Bassora, and other parts of the Indies, and in Africa, where the animal that produces the perfume is found. Live civet-cats are to be seen also in France and Holland. The French keep them only as a rarity; but the Dutch, who keep a great number, draw the civet from them for sale. It is mostly used by confectioners and perfumers.

CIVET-Cat, the English name of the animal which produces the civet. See VIVERRA.

CIVIC CROWN, was a crown given by the ancient Romans to any soldier who had saved the life of a citizen in an engagement.

The civic crown was reckoned more honourable than any other crown, though composed of no better materials than oak-boughs. Plutarch, in the life of C. M. Coriolanus, accounts as follows, for using on this occasion the branches of this tree before all others: because, says he, the oak wreath being sacred to Jupiter, the great guardian of their city, they thought it the most proper ornament for him who had preserved the life of a citizen. Pliny*, speaking of the honour and privileges conferred on those who had merited this crown, says, "They who had once obtained it, might wear it always. When they appeared at the public spectacles, the senate and people rose to do them honour, and they took their seats on these occasions among the senators. They were not only personally excused from all troublesome offices, but procured the same immunity for their father and grandfather by the father's side."

CIVIDAD.

Cives
h
Civic.

* See Lord Lyttelton's *History of Henry II.* vol. 2. B. 317.

* Lib. 16.
cap. 4.

CIVIDAD-DE-LAS-PALMAS, the capital town of the island of Canary, with a bishop's see, and a good harbour. The houses are well-built, two stories high, and flat-roofed. The cathedral is a very handsome structure; and the inhabitants are gay and rich. The air is temperate, and free from extremes of heat and cold. It is defended by a small castle seated on a hill. W. Long. 14. 35. N. Lat. 28. 0.

CIVIDAD-REAL, a town of Spain, in New Castile, and capital of La Mancha. The inhabitants are noted for dressing leather extremely well for gloves. W. Long. 4. 15. N. Lat. 39. 2.

CIVIDAD-RODRIGO, a strong and considerable town of Spain, in the kingdom of Leon, with a bishop's see. It is seated in a fertile country, on the river Aquada, in W. Long. 6. 52. N. Lat. 40. 38.

CIVIDAD-di-FRIULI, a small, but ancient town of Italy, in Friuli, and in the territory of Venice; seated on the river Natifona. E. Long. 13. 25. N. Lat. 46. 15.

CIVIL, in a general sense, something that regards the policy, public good, or peace of the citizens, or subjects of the state; in which sense we say, civil government, civil law, civil right, civil war, &c.

CIVIL, in a legal sense, is also applied to the ordinary procedure in an action, relating to some pecuniary matter or interest, in which sense it is opposed to criminal.

CIVIL Death, any thing that cuts off a man from civil society; as a condemnation to the galleys, perpetual banishment, condemnation to death, outlawry, and excommunication.

CIVIL Law, is properly the peculiar law of each state, country, or city: but what we usually mean by the civil law, is a body of laws composed out of the best Roman and Grecian laws, compiled from the laws of nature and nations; and, for the most part, received and observed throughout all the Roman dominions for above 1200 years. See **LAW**, Part I. n° 43, 44.

CIVIL Society. See **LAW**, Part I. n° 12.

CIVIL State, in the British polity, one of the general divisions of the **LAITY**, comprehending all orders of men from the highest nobleman to the meanest peasant that are not included under the **MILITARY** or **MARITIME** states: though it may sometimes include individuals of these as well as of the **CLERGY**; since a nobleman, a knight, a gentleman, or a peasant, may become either a divine, a soldier, or a seaman. The division of this state is into **NOBILITY** and **COMMONALTY**; see these articles.

CIVIL War, a war between people of the same state, or the citizens of the same city.

CIVIL Year, is the legal year, or annual account of time, which every government appoints to be used within its own dominions; and is so called in contradistinction to the natural year, which is measured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes something belonging to the civil law; but more especially the doctors and professors thereof are called *civilians*.

CIVITA-DI-PENNA, an ancient town of Italy, in the kingdom of Naples, and in the Farther Abruzzo, with a bishop's see. It is situated near the river Salvo. Vol. III.

no, 25 miles north east of Aquila. E. Long. 13. 3. N. Lat. 42. 25.

CIVITA-Castellana, a town of Italy, in St Peter's patrimony, seated on a river, which, seven miles from thence, falls into the Tiber. E. Long. 13. 3. N. Lat. 42. 15.

CIVITA-Turchino, a place in Italy, about two miles north of the town of Corneto in the patrimony of St Peter. It is an hill of an oblong form, the summit of which is almost one continued plain. From the quantity of medals, intaglios, fragments of inscriptions, &c. that are occasionally found here, this is believed to be the very spot where the ancient and powerful city of Tarquinii once stood. At present it is only one continued field of corn. On the south-east side of it runs the ridge of a hill which unites it to Corneto. This ridge is at least three or four miles in length, and almost entirely covered with artificial hillocks, called by the inhabitants *monti rossi*. About twelve of these hillocks have at different times been opened; and in every one of them have been found several subterranean apartments cut out of the solid rock. These apartments are of various forms and dimensions: some consist of a large outer room, and a small one within; others of a small room at the first entrance, and a large one within: others are supported by a column of the solid rock left in the centre, with openings on every part. The entrance to them all is by a door about five feet high, by two and a half broad. Some of them have no light but from the door, while others seem to have had a small light from above, through an hole of a pyramidal form.

Many of these apartments have an elevated port that runs all round the wall, being a part of the rock left for that purpose. The moveables found in these apartments consist chiefly of Etruscan vases of various forms: in some indeed have been found some plain sarcophagi of stone, with bones in them. The whole of these apartments are stuccoed, and ornamented in various manners: some indeed are plain; but others, particularly three, are richly adorned, having a double row of Etruscan inscriptions running round the upper part of the walls, and under them a kind of frieze of figures in painting: some have an ornament under the figures, which seems to supply the place of an architecture. The paintings seem to be in fresco; and in general resemble those which are usually seen upon Etruscan vases; though some of them are perhaps superior to any thing as yet seen of the Etruscan art in painting. In general they are slight, but well conceived; and prove, that the artist was capable of producing things more studied and better finished; though in such a subterraneous situation, the delicacy of a finished work would in a great measure have been thrown away. It is probable, however, that among the immense number of these apartments that yet remain to be opened, many paintings and inscriptions may be found sufficient to form a very useful and entertaining work. At present this great scene of antiquities is almost entirely unknown, even in Rome. Mr Jenkins resident at Rome, was the first Englishman who visited it.

CIVITA-Pecchia, a sea-port town of Italy in the patrimony of St Peter, with a good harbour and an arsenal.

Civoli
|
Clamp.

arsenal. Here the Pope's galleys are stationed, and it has lately been made a free port; but the air is very unwholesome. E. Long. 12. 31. N. Lat. 45. 5.

CIVOLI, or **CIGOLI**, (Lewis), an Italian painter, whose family-name was *Gardi*, was born at the castle of Cigoli, in Tuscany, in the year 1559. His *ecce homo*, which he performed as a trial of skill with Barocchio and Michael Angelo da Caravaggio, was judged better than those executed by them. He excelled in designing, and was employed by the popes and princes of his time. He died at Rome in 1613.

CLACK, among countrymen. To clack wool, is to cut off the sheep's mark, which makes the weight less, and yields less custom to the king.

CLACKMANNAN, the name of a small shire in Scotland, not exceeding eight miles in length, and five in breadth. It is bounded on the north by the Ochil hills; on the south, by the frith of Forth; on the east, by Perth-shire; and on the west, by Stirling-shire. The country is plain and fertile towards the frith, producing corn and pasture in abundance. It likewise yields great quantities of excellent coal, which is exported to England, France, and Holland. It is watered by the rivers Forth and Devan, and joins the shire of Kinross in sending a member alternately to parliament.

CLACKMANNAN, a small town of Scotland, and capital of the county of that name, is situated on the northern shore of the Forth, in W. Long. 3. 40. N. Lat. 56. 15. It stands on a hill, on the top of which is the castle, commanding a noble prospect. It was long the seat of the chief of the Bruces, who was hereditary sheriff of the county before the jurisdictions were abolished. The large square tower is called after the name of *Robert Bruce*; whose great sword and casque are still preserved here. The hill is prettily wooded; and, with the tower, forms a picturesque object.

CLAGENFURT, a strong town of Germany, and capital of Carinthia, situated in E. Long. 13. 56. N. Lat. 46. 50.

CLAGET (William), an eminent and learned divine, born in 1646. He was preacher to the society of Gray's Inn; which employment he exercised until he died in 1688, being then also one of the king's chaplains. Archbishop Sharp gives him an excellent character; and bishop Burnet has ranked him among those worthy men whose lives and labours contributed to rescue the church from the reproaches which the follies of others had drawn upon it. Dr Claget published several things; but his principal work is his "Discourse concerning the Operations of the Holy Spirit;" nor must it be forgotten that he was one of those excellent divines who made a noble stand against the designs of James II. to introduce popery. Four volumes of his sermons were published after his death by his brother Nicholas Claget, archdeacon of Sudbury, father of Nicholas Claget afterwards bishop of Exeter.

CLAIM, in law, a challenge of interest in any thing that is in the possession of another.

CLAM, in zoology, a shell-fish. See **VENUS**.

CLAMP, a piece of wood joined to another.

CLAMP is likewise the term for a pile of unburnt

bricks built up for burning. These clamps are built much after the same manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to ascend by; but with this difference, that instead of arching, they truss over, or over-span; that is, the end of one brick is laid about half way over the end of another, and so till both sides meet within half a brick's length, and then a binding brick at the top finishes the arch.

CLAMP in a Ship, denotes a piece of timber applied to a mast or yard to prevent the wood from bursting; and also a thick plank lying fore and aft under the beams of the first orlop, or second deck, and is the same that the riling timbers are to the deck.

CLAMP-Nails, such nails as are used to fasten on clamps in the building or repairing of ships.

CLAMPING, in joinery, is the fitting a piece of board with the grain, to another piece of board cross the grain. Thus the ends of tables are commonly clamped, to prevent their warping.

CLANDESTINE, any thing done without the knowledge of the parties concerned, or without the proper solemnities. Thus a marriage is said to be clandestine, when performed without the publication of bans, the consent of parents, &c.

CLANS, in history, and particularly in that of Scotland. The nations which over-ran Europe were originally divided into many small tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to bestow a portion, in the first place, upon those of his own tribe or family. These all held their lands of him; and as the safety of each individual depended on the general union, these small societies clung together, and were distinguished by some common appellation, either patronymical, or local, long before the introduction of surnames or ensigns armorial. But when these became common, the descendants and relations of every chieftain assumed the same name and arms with him; other vassals were proud to imitate their example; and by degrees they were communicated to all those who held of the same superior. Thus clanships were formed; and, in a generation or two, that consanguinity, which was at first in a great measure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the superior of their lands, and the chief of their blood; and served him not only with the fidelity of vassals, but the affection of friends. In the other feudal kingdoms, we may observe such unions as we have described, imperfectly formed; but in Scotland, whether they were the production of chance, or the effect of policy, or strengthened by their preserving their genealogies both genuine and fabulous, clanships were universal. Such a confederacy might be overcome; it could not be broken; and no change of manners or government has been able, in some parts of the kingdom, to dissolve associations which are founded upon prejudices so natural to the human mind. How formidable were nobles at the head of followers, who, counting that cause just and honourable which their chief approved, were ever ready to take the field at his command, and to sacrifice their lives in defence of his person or

Clamp
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Clans.

Robertson's
History of
Scotland.

Clap
Clarichord.

of his fame? Against such men a king contended with great disadvantage; and that cold service, which money purchases, or authority extorts, was not an equal match for their ardour and zeal.

Some imagine the word *clan* to be only a corruption of the Roman *colonia*; but Mr Whittaker asserts it to be purely British, and to signify a *family*.

CLAP, in medicine, the first stage of the venereal disease, more usually called a GONORRHOEA.

CLAP-Net, in birding, a sort of net contrived for the taking of larks with the looking-glass, by the method called *during* or *doring*. The nets are spread over an even piece of ground, and the larks are invited to the place by other larks fastened down, and by a looking-glass composed of five pieces, and fixed in a frame so that it is turned round very swiftly backwards and forwards, by means of a cord pulled by a person at a considerable distance behind a hedge. See DORING.

CLAR, or CLAER, in metallurgy, bone-ashes perfectly calcined, and finely powdered, kept purposely for covering the insides of COPPELS.

CLARAMONT-POWDER, a kind of earth, called *terra de Baira*, from the place where it is found: it is famous at Venice, for its efficacy in stopping hæmorrhages of all kinds, and in curing malignant fevers.

PRECEPT of CLARE CONSTAT, in Scots law, the warrant of a superior for entering and infesting the heir of his former vassal, without the interposition of an inquest. See LAW, Part III. n^o clxxx. 28.

CLARE, a market-town of Suffolk, 13 miles south of Bury. E. Long. 35°. N. Lat. 52. 15. It gives the title of Earl to the duke of Newcastle.

CLARE is also the capital of a county of the same name in the province of Connaught, in Ireland, situated about 17 miles north-west of Limerick. W. Long. 9. o. N. Lat. 52. 40.

CLARENCEUX, the second king at arms, so called from the duke of Clarence, to whom he first belonged: for Lionel, 3^d son to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards escheated to Edward IV. he made this earl a king at arms. His office is to marshal and dispose of the funerals of all the lower nobility, as baronets, knights, esquires, on the south side of the Trent; whence he is sometimes called *surroy* or *south-roy*, in contradistinction to *norroy*.

CLARENDON (Constitutions of), certain constitutions made in the reign of Henry II. A.D. 1164, in a parliament held at Clarendon; whereby the king checked the power of the Pope and his clergy, and greatly narrowed the total exemption they claimed from secular jurisdiction.

CLARENDON (Earl of). See HYDE.

CLARENZA, the capital of a duchy of the same name in the Morea; it is a sea-port town, situated on the Mediterranean. E. Long. 21. 40. N. Lat. 37. 40.

CLARET, a name given by the French to such of their red wines as are not of a deep or high colour. See WINE.

CLARICHORD, or MANICHORD, a musical instrument in form of a spinnet.

It has 49 or 50 stops, and 70 strings, which bear

on five bridges, the first whereof is the highest, the rest diminishing in proportion. Some of the strings are in unison, their number being greater than that of the stops. There are several little mottoes for passing the jacks, armed with brafs-hooks, which stop and raise the chords instead of the feather used in virginals and spinnets: but what distinguishes it most is, that the chords are covered with pieces of cloth, which render the sound sweeter, and deaden it so that it cannot be heard at any considerable distance: whence it comes to be particularly in use among the nuns, who learn to play, and are unwilling to disturb the silence of the dormitory.

CLARIFICATION, the act of cleaning or fining any fluid from all heterogeneous matter or feculencies.

The substances usually employed for clarifying liquors, are whites of eggs, blood, and isinglass. The two first are used for such liquors as are clarified whilst boiling hot; the last for those which are clarified in the cold, such as wines, &c. The whites of eggs are beat up into a froth, and mixed with the liquor, upon which they unite with and entangle the impure matters that floated in it; and presently growing hard, by the heat, carry them up to the surface in form of a scum no longer dissoluble in the liquid. Blood operates in the same manner, and is chiefly used in purifying the brine from which salt is made. Great quantities of isinglass are consumed for fining turbid wines. For this purpose some throw an entire piece, about a quarter of an ounce, into a wine cask; by degrees the glue dissolves, and forms a skin upon the surface, which at length subsiding, carries down with it the feculent matter which floated in the wine. Others previously dissolve the isinglass; and having boiled it down to a slimy consistence, mix it with the liquor, roll the cask strongly about, and then suffer it to stand to settle. Neuman questions the wholesomeness of wines thus purified; and assures us that he himself, after drinking only a few ounces of sack thus clarified, but not settled quite fine, was seized with sickness and vomiting, followed by such a vertigo that he could not stand upright for a minute together. The giddiness continued with a nausea and want of appetite for several days.

CLARIGATIO, in Roman antiquity, a ceremony that always preceded a formal declaration of war. It was performed in this manner: first four heralds crowned with vervain, were sent to demand satisfaction for the injuries done the Roman state. These heralds taking the gods to witness that their demands were just, one of them, with a clear voice, demanded restitution within a limited time, commonly 33 days; which being expired without restitution made, then the *pater patratus*, or prince of the heralds, proceeded to the enemies frontiers, and declared war.

CLARION, a kind of trumpet, whose tube is narrower and its tone acuter and shriller than that of the common trumpet. It is said that the clarion, now used among the Moors and Portuguese, who borrowed it from the Moors, served anciently for a treble to several trumpets, which sounded tenor and bass.

CLARISSES, an order of nuns so called from their

Clarification
Clarifies.

Clarke. founder St Clara. She was in the town of Affisa in Italy; and having renounced the world to dedicate herself to religion, gave birth to this order in the year 1212; which comprehends not only these nuns that follow the rule of St Francis, according to the strict letter, and without any mitigation, but those likewise who follow the same rule softened and mitigated by several popes. It is at present one of the most flourishing orders of nuns in Europe. After Ferdinand Cortez had conquered Mexico for the king of Spain, Isabella of Portugal, wife of the emperor Charles V. sent thither some nuns of the order of St Clara, who made several settlements there. Near their monasteries were founded communities of Indian young women, to be instructed by the clarisses in religion, and such works as were suitable to persons of their sex. These communities are so considerable that they usually consist of four or five hundred.

CLARKE (Samuel) D. D. a preacher and writer of considerable note in the reign of Charles II. was, during the inter-regnum, and at the time of the ejection, minister of St Bennet Fink in London. In November 1660, he, in the name of the Presbyterian ministers, presented an address of thanks to the king for his declaration of liberty of conscience. He was one of the commissioners of the Savoy; and behaved on that occasion, with great prudence and moderation. He sometimes attended the church as an hearer and communicant; and was much esteemed by all that knew him, for his great probity and industry. The most valuable of his numerous works are said to be his *Lives of the Puritan Divines* and other persons of note, 22 of which are printed in his *martryology*: the rest are in his *Lives of Eminent Persons* in this latter Age, folio; and in his *Marrow of Ecclesiastical History*, in folio and quarto. He died in 1680.

CLARKE (Samuel), the son of the former, was fellow of Pembroke-hall, in Cambridge; but was ejected from his fellowship for refusing to take the engagements, as he was also afterwards from his rectory of Grendon, in Buckinghamshire. He applied himself early to the study of the Scriptures; and his annotations on the Bible, printed together with the sacred text, is highly commended by Dr Owen, Mr Baxter, and Dr Calamy. He died in 1701, aged 75.

CLARKE (Dr Samuel), was born in the city of Norwich in 1675. His father was an alderman of that city, and one of the representatives of it in parliament for several years. In 1691, he went to Caius-college Cambridge; where, though the Cartesian philosophy then prevailed, he soon made himself master of the Newtonian system; and in order to his first degree, surprised the whole audience by the accuracy with which he traced a question in it. In 1697, he published a Latin translation of Rohault's physics, with annotations. After this he turned his thoughts to divinity; and met with a favourable opportunity; being, in 1699, appointed chaplain to Dr John Moore, then bishop of Norwich, who treated him with all the marks of the highest esteem. In 1701, he published his paraphrase upon the gospel of St Matthew, which was followed by the paraphrases on St Mark and St Luke, and soon after on St John, so universally admired. He intended to have gone through all the re-

maining books of the New Testament, but was diverted from it. In 1704 and 1705, he preached, and soon after published, 16 sermons at Boyle's lecture, so justly admired. In 1706, he published his letter to Mr Dodwell, concerning the immortality of the soul; which was soon followed by four defenses of it, and the Answer to Toland's *Amyntor* added to them. The same year he translated Sir Isaac Newton's optics into Latin. Queen Anne, to whose favour his own merits recommended him, upon the vacancy of St James's, Westminster, presented him with that rectory. Upon this advancement he took his degree of doctor of divinity in the university of Cambridge; on which occasion his public exercise was prodigiously applauded. In 1712, he published a splendid edition of Caesar's Commentaries, dedicated to the duke of Marlborough; and the same year appeared his Scripture Doctrine of the Trinity, which gave occasion to a great number of books upon that subject by himself as well as others, and was complained of by the lower house of convocation: but the upper house declared themselves satisfied with his explanations upon the subject of the complaint. In 1715, he had a dispute with Mr Leibnitz relating to some principles of natural philosophy and religion; and the papers that passed between them were published at London in 1717. His alterations in the forms of Doxology occasioned a considerable controversy. In 1724, he published 17 sermons; and, the year following, his "Discourse concerning the connection of the Prophecies in the Old Testament, and the application of them in the New to Christ," in answer to a famous book of Mr Collins, intitled "Grounds and reasons of the Christian Religion." Upon the death of Sir Isaac Newton, he was offered by the court the place of master of the mint, worth L. 1500 a-year, which he refused. In 1728, he wrote a letter to Mr Benjamin Hoadley, F. R. S. occasioned by the controversy relating to the proportion of velocity and force of bodies in motion; and in the beginning of the year following, he published at London, in 4to, twelve books of Homer's Iliad, with the Latin version, accurately corrected, and learned notes, dedicated to the duke of Cumberland. He died in 1729; and since his death there have been published his exposition of the church-catechism, and 10 volumes of his sermons. He was a man of deep penetration; a sincere lover of truth; profoundly acquainted with the abstrusest speculations; and an amiable example of the temper, studies, and practice, becoming a Christian divine.

CLARO-OBSCURO, or **CLAIR-OBSCURE**, in painting, the art of distributing to advantage the lights and shadows of a piece, both with respect to the easing of the eye, and the effect of the whole piece.

CLARO-Obscuro, or **Chiaro-scuro**, is also used to signify a design consisting only of two colours, most usually black and white, but sometimes black and yellow; or it is a design washed only with one colour, the shadows being of a dusky brown, and the lights heightened up by white.

The word is also applied to prints of two colours taken off at twice: whereof there are volumes in the cabinets of those who are curious in prints.

CLARY, in botany. See **SALVIA**.

CLARY-

Clarke
Clary.

Clary
Clavaria.

CLARY-*Water*, a spirit drawn from an infusion of the herb clary in spirit of wine; being a very pleasant and excellent cordial.

CLASMIUM, in natural history, the name of a genus of fossils, of the class of the gypsums; the characters of which are, that they are of a soft texture, and of a dull opaque look, being composed, as all the other gypsums, of irregularly arranged flat particles.

The word is derived from the Greek *κλασμός*, a fragment or small particle; from the flaky small particles of which these bodies are composed: of this genus there is only one known species: this is of a tolerably regular and even structure; though very coarse and harsh to the touch. It is of a very lively and beautiful red in colour; and is found in thick roundish masses, which, when broken, are to be seen composed of irregular arrangements of flat particles; and emulate a striated texture. It will neither give fire with steel, nor ferment with acids; but calcines very freely and easily, and affords a very valuable plaster of Paris, as do all the purer gypsums. It is common in Italy, and is greatly esteemed there; it is also found in some parts of England, particularly Derbyshire, but there is not much regarded.

CLASPERS, or TENDRILS. See CIRRHUS.

CLASS, an appellation given to the most general subdivisions of any thing: thus, *animal* is subdivided into the classes quadrupeds, birds, fishes, &c. which are again subdivided into serieses or orders; and these last into genera. See BOTANY, and ZOOLOGY.

CLASS, is also used in schools, in a synonymous sense with *form*, for a number of boys all learning the same thing.

CLASSIC, or CLASSICAL, an epithet, chiefly applied to authors read in the classes at schools.

This term seems to owe its origin to Tullius Servius, who, in order to make an estimate of every person's estate, divided the Roman people into six bands, which he called *classes*. The estate of the first class was not to be under 200l. and these by way of eminence were called *classici*, classics: hence authors of the first rank came to be called classics, all the rest being said to be *infra classem*: thus Aristotle is a classic author in philosophy; Aquinas, in school-divinity, &c.

CLATHRI, in antiquity, bars of wood or iron, used in securing doors and windows. There was a goddess called *Clathra*, that presided over the clathri.

CLAVARIA, CLUB-TOP; a genus of the order of the fungi, belonging to the cryptogamia class of plants. There are 16 species, of which none are remarkable except the hemotades, or oak-leather club-top. This exactly resembles tanned leather, except that it is thinner and softer. It is of no determinate form. It grows in the clefts and hollows of old oaks, and sometimes on ash in Ireland and in some places of England, &c. In Ireland it is used to dress ulcers, and in Virginia to spread plaisters upon, instead of leather.

A modern writer on natural history, (Mr Miller), has asserted the whole genus of clavaria to belong to the tribe of *zoophytes*, that is, to the animal, and not to the vegetable kingdom. According to his method, he ranks them among the Vermes, under a subdivision which he terms *Fungosa osculis atomiferis*; thereby un-

derstanding them to be compound animals with many orifices on their surface, from which are protruded atoms or animalcules which have a visible spontaneous motion, something similar to what is now acknowledged to be a fact with regard to a numerous class of marine bodies termed *corallines*. This motion, however, has not been observed by other naturalists. Schæffer has figured the seeds of several clavaria: as they appeared to him through the microscope; and none of these fungi when burnt, emit the strong disagreeable smell peculiar to animal substances.

CLAVARIUM, in antiquity, an allowance the Roman soldiers had for furnishing nails to secure their shoes with. They raised frequent mutinies, demanding largesses of the emperors under this pretence.

CLAVATA VESTIMENTA, in antiquity, habits adorned with purple clavi, which were either broad or narrow. See CLAVUS.

CLAUBERGE (John), a learned professor of philosophy and divinity at Duisburg, was born at Solingen in 1622. He travelled into Holland, France, and England, and in each country obtained the esteem of the learned. The elector of Brandenburg gave him public testimonies of his esteem. He died in 1665. His works were printed at Amsterdam in 2 vols 4to. The most celebrated of these is his treatise intitled *Logica vetus et nova*, &c.

CLAUDE of LORRAIN, a celebrated landscape painter, and a striking example of the efficacy of industry to supply, or at least to call forth, genius. Claude was born in 1600; and being dull and heavy at school, was put apprentice to a pastry-cook: he afterwards rambled to Rome to seek a livelihood; but being very ill-bred, and unacquainted with the language, no body cared to employ him. Chance threw him at last in the way of Augustino Trassio, who hired him to grind his colours, and to do all his household drudgery, as he kept no other servant. Here his soul enlarged apace, under the instructions of his master, who hoped to extend the abilities of his service; and he would at length continue whole days on the banks of the Tiber, and in the open fields, deriving his lessons from nature alone. He was as much admired for his performances in fresco as in oil; and was often employed by pope Urban VIII. and many of the Italian princes, in adorning their palaces, till his death in 1682.

CLAUDE (John), a Protestant divine, born in the province of Angoumois in 1619. Mess. de Port Royal using their utmost endeavours to convert M. de Turenne to the catholic faith, presented him with a piece calculated to that end, which his lady engaged Mr Claude to answer; and his performance gave rise to the most famous controversy that was ever carried on in France between the Roman Catholics and Protestants. On the revocation of the edict of Nantz, he retired to Holland, where he met with a kind reception, and was honoured with a considerable pension by the prince of Orange. He died in 1687; and left a son Isaac Claude, whom he lived to see minister of the Walloon church at the Hague, and who published several excellent works of his deceased father.

CLAUDIA, a vestal virgin at Rome, who, being suspected of unchastity, is said to have been cleared from

Clavarium
Claudia.

Claudianus
|
Clavus.

from that imputation in the following manner: the image of Cybele being brought out of Phrygia to Rome in a barge, and it happening to tickle so fast in the river Tyber that it could not be moved, she tying her girdle, the badge of chastity, to the barge, drew it along to the city, which a thousand men were unable to do.

CLAUDIUS (Claudius), a Latin poet, flourished in the 4th century, under the emperor Theodosius, and under his sons Arcadius and Honorius. It is not agreed of what country he was a native; but he came to Rome in the year of Christ 395, when he was about 30 years old; and there insinuated himself into Stilicho's favour; who being a person of great abilities both for civil and military affairs, though a Goth by birth, was so considerable a person under Honorius, that he may be said for many years to have governed the western empire. Stilicho afterwards fell into disgrace, and was put to death; and it is more than probable that the poet was involved in the misfortunes of his patron, and severely persecuted in his person and fortunes by Hadrian, an Egyptian by birth, who was captain of the guards to Honorius, and succeeded Stilicho. There is reason, however, to think that he rose afterwards to great favour; and obtained several honours both civil and military. The princess Serena had a great esteem for Claudian, and recommended and married him to a lady of great quality and fortune in Libya. There are a few little poems on sacred subjects, which through mistake have been ascribed by some critics to Claudian; and so have made him be thought a Christian. But St. Austin, who was cotemporary with him, expressly says, that he was a Heathen. The time of Claudian's death is uncertain, nor do we know any further particulars of his life than what are to be collected from his works, and which we have already related above. He is thought to have more of Virgil in his style than all the other imitators of him.

CLAUDIUS I. Roman emperor, *A. D.* 41. The beginning of his reign was very promising; but it was soon discovered that little better than an idiot filled the throne, who might easily be made a tyrant: accordingly he became a very cruel one, through the influence of his empress, the infamous Messalina: after her death, he married his niece Agrippina, who caused him to be poisoned to make way for Nero, *A. D.* 54. See (*History of*) *Rome*.

CLAUDIUS II. (Aurelius) surnamed *Gothicus*, signified himself by his courage and prudence under the reigns of Valerian and Julian; and on the death of the latter was declared emperor in 268. He put to death Aureolus, the murderer of Galienus; defeated the Germans; and in 269 marched against the Goths, who ravaged the empire with an army of 300,000 men, which he at first harried, and the next year entirely defeated: but a contagious disease, which had spread through that vast army, was caught by the Romans; and the emperor himself died of it a short time after, aged fifty-six. Pollio says that this prince had the moderation of Augustus, the virtue of Trajan, and the piety of Antoninus.

CLAVES INSULE, a term used in the Isle of May; where all weighty and ambiguous causes are referred to a jury of twelve, who are called *claves insule*, the keys of the island.

Clavichord
|
Clavus.

CLAVICHORD, and **CLAVICITHERIUM**, two musical instruments used in the 16th century. They were of the nature of the spinnet, but of an oblong figure. The first is still used by the nuns in convents; and that the practitioners may not disturb the sisters in the dormitory, the strings are muffled with small bits of fine woollen cloth.

CLAVICLE. See *ANATOMY*, n^o 45.

CLAVICYMBALUM, in antiquity, a musical instrument with 30 strings. Modern writers apply the name to our harpichords.

CLAVI VESTIUM, were flowers or studs of purple interwoven with or sewed upon the garments of knights or senators; only, for distinction, the former used them narrow, the latter broad.

CLAVIS properly signifies a **KEY**; and is sometimes used in English to denote an explanation of some obscure passages of any book or writing.

CLAVIUS (Christopher), a German Jesuit born at Bamberg, excelled in the knowledge of the mathematics, and was one of the chief persons employed to rectify the calendar; the defence of which he also undertook against those who censured it, especially Scaliger. He died at Rome in 1612, aged 75. His works have been printed in five volumes folio; the principal of which is his commentary on Euclid's elements.

CLAUSE, in grammar, denotes a member of a period or sentence.

CLAUSE signifies also an article or particular stipulation in a contract, a charge or condition in a testament, &c.

CLAUSENBURG, a large city of Transylvania, situated on the river Samos, in E. Long. 20. 50. N. Lat. 47. 10.

CLAVUS, in antiquity, an ornament upon the robes of the Roman senators and knights; which was more or less broad, according to the dignity of the person: hence the distinction of *tunica augusti-clavia* and *lati-clavia*.

CLAVUS, in medicine and surgery, is used in several significations: 1. *Clavus hytericus*, is a shooting pain in the head, between the pericranium and cranium, which affects such as have the green-sickness. 2. *Clavus oculorum*, according to Celsus, is a callous tubercle on the white of the eye, taking its denomination from its figure. 3. *Clavus* imports indurated tubercles of the uterus. 4. It also imports a surgical instrument of gold, mentioned by Amatus Lusitanus, designed to be introduced into an excruciated palate, for the better articulation of the voice. And, 5. It signifies a callus, or corn on the foot.

CLAVUS Annalis, in antiquity. So rude and ignorant were the Romans towards the rise of their state, that the driving or fixing a nail was the only method they had of keeping a register of time; for which reason it was called *clavus annalis*. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right side of the temple of Jupiter Opt. Max. towards Minerva's temple. This custom of keeping an account of time by means of fixing nails, was not peculiar to the Romans; for the Etrurians used likewise

wife to drive nails into the temple of their goddess Nortia with the same view.

CLAW, among zoologists, denotes the sharp-pointed nails with which the feet of certain quadrupeds and birds are furnished.

Crab's CLAWS, in pharmacy. See *Crab's Claws*.

CLAY, in natural history, a genus of earths, the characters of which are these: They are firmly coherent, weighty, and compact; stiff, viscid, and ductile to a great degree, while moist; smooth to the touch; not easily breaking between the fingers, nor readily diffusible in water; and, when mixed, not readily subdividing from it. See *CHEMISTRY*, n° 35.

Clay shrinks remarkably when drying; in so much that Dr Lewis observes, the purity of it may be known by the degree to which it shrinks. He made experiments on it when pure, and when mixed with various proportions of sand. Pure clay he found shrank one part in 18 while drying; but, when mixed with twice its weight of sand, only one part in 30.

CLAY, a town of Norfolk in England, seated on an arm of the sea between two rivers, in E. Long. o. 30. N. Lat. 47. 28.

CLAY-Lands, those abounding with clay, whether black, blue, yellow, *&c.* of which the black and the yellow are the best for corn.

All clay-foils are apt to chill the plants growing on them in moist seasons, as they retain too much water; in dry seasons, on the contrary, they turn hard and choke the plants. Their natural produce is weeds, goose-grass, large daisies, thistles, docks, poppies, *&c.* Some clay-foils will bear clover and rye-grass; and, if well manured, will produce the best grain: they hold manure the best of all lands; and the most proper for them are horse-dung, pigeon's dung, some kinds of marle, folding of sheep, malt-dust, ashes, chalk, lime, foot, *&c.*

CLAYTONIA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants. There are two species, natives of America. They are very low herbaceous plants, with white flowers; and are possessed of no remarkable property.

CLEANTHES, a stoic philosopher, disciple of Zeno, flourished 240 years before Christ. He maintained himself in the day, by working in the night: being questioned by the magistrates how he subsisted, he brought a woman for whom he kneaded bread, and a gardener for whom he drew water; and refused a present from them. He composed several works, of which there are now only a few fragments remaining.

CLEAR, as a naval term, is variously applied to the weather, the sea-coasts, cordage, navigation, *&c.* The weather is said to be clear when it is fair and open, as opposed to cloudy or foggy. The sea-coast is called clear when the navigation is not interrupted, or rendered dangerous by rocks, sands, or breakers, *&c.* It is expressed of cordage, cables, *&c.* when they are unembarrassed, or disentangled, so as to be ready for immediate service. It is usually opposed to *foul*, in all these senses.

CLEATS, in naval affairs, pieces of wood, having one or two projecting ends whereby to fasten the

ropes: some of them are fastened to the shrouds below for this purpose, and others nailed to different places of the ship's deck or sides.

CLÈCHE, in heraldry, a kind of cross, charged with another cross of the same figure, but of the colour of the field.

CLEDGE, among miners, denotes the upper stratum of fuller's earth.

CLEF, or **CLIFF**, in music, derived from the Latin word *clavis*, a key; because by it is expressed the fundamental found in the diatonic scale, which requires a determin'd succession of tones or semitones, whether major or minor, peculiar to the note from whence we set out, and resulting from its position in the scale. Hence, as it opens a way to this succession, and discovers it, the technical term *key* is used with great propriety. But clefs rather point out the position of different musical parts in the general system, and the relations which they bear one to another.

A clef, says Rousseau, is a character in music placed at the beginning of a stave, to determine the degree of elevation occupied by that stave in the general claviary or system, and to paint out the names of all the notes which it contains in the line of that clef.

Anciently the letters by which the notes of the gammut had been signified were called *clefs*. Thus the letter A was the clef of the note *la*, C the clef of *ut*, E the clef of *mi*, &c. In proportion as the system was extended, the embarrassment and superfluity of this multitude of clefs were felt.

Gui d'Arezzo who had inverted them, marked a letter or clef at the beginning of each line in the stave; for as yet he had placed no notes in the spaces. In process of time they marked no more than one of the seven clefs at the beginning of one of the lines only; and this was sufficient to fix the position of all the rest, according to their natural order: at last, of these seven lines or clefs, they selected four, which were called *claves signatæ*, or *discriminating clefs*; because they satisfied themselves with marking one of them upon one of the lines, from which the powers of all the others might be recognized. Presently afterwards they even retrenched one of these four, *viz.* the gamma, of which they made use to mark the *sol* below, that is to say, the hypoproslambanomenon added to the system of the Greeks.

In reality Kircher asserts, that if we understood the characters in which ancient music was written, and examined minutely the forms of our clefs, we should find that each of them represent the letter a little altered in its form, by which the note was originally named. Thus the clef of *sol* was originally a G, the clef of *ut* a C, and the clef of *fa* an F.

We have then three clefs, one a fifth above the other. The clef of F, or *fa*, which is the lowest; the clef of *ut*, or C, which is a fifth above the former; and the clef of *sol*, or G, which is a fifth above that of *ut*. These clefs, both as marked by foreigners and in Britain, may be seen in art. 170. of Music; upon which it is necessary to remark, that, by a remain of ancient practice, the clef is always placed upon a line, and never in a space. It deserves notice, that the clef of *fa* is marked in three different

Clef. rent manners: one in music which is printed; another in music which is written or engraven; and a third in the full harmony of the chorus. See plate LXXXII. fig. 10.

By adding four lines above the clef of *sol*, and three lines beneath the clef of *fa*, which gives both above and below the greatest extent of permanent or established lines, it appears, that the whole scale of notes which can be placed upon the gradations relative to these clefs amounts to 24; that is to say, three octaves and a fourth from the *F*, or *fa*, which is found beneath the first line, to the *si*, or *B*, which is found above the last, and all this together forms what we call the *general claviary*; from whence we may judge, that this compass has, for a long time, constituted the extent of the system. But as at present it is continually acquiring new degrees, as well above as below, the degrees are marked by leger lines, which are added above or below as occasion requires.

Instead of joining all the lines, as has been done by Rousseau in his Dictionary, (plate A, fig. 5.) to mark the relation which one clef bears to another, they separate them five by five; because it is pretty nearly within the degrees to which the compass of ordinary voices extends. This collection of five lines is called a *stave*; and in these they place a clef, to determine the names of the notes, the positions of semitones, and to shew what station the stave occupies in the claviary or general scale.

In whatever manner we take five successive lines in the claviary, we shall find one clef comprehended; nay, sometimes two; in which case one may be retrenched as useless. Custom has even prescribed which of the two should be retrenched, and which retained; it is this likewise which has determined the number of positions assigned to each clef.

If I form a stave of the first five lines in the claviary, beginning from below, I find the clef of *fa* in the fourth line. This then is one position of the clef, and this position evidently relates to the lowest note; thus likewise it is that of the bass clef.

If I wish to gain a third in ascent, I must add a line above; I must then obliterate one below, otherwise the stave will contain more than five lines. The clef of *fa* then is found transferred from the fourth to the third, and the clef of *ut* is likewise found upon the fifth; but as two clefs are useless, they retrench here that of *ut*. It is evident, that the stave of this clef is a third higher than the former.

By throwing away still one line below to gain another above, we have a third kind of stave, where the clef of *fa* will be found upon the second line, and that of *ut* upon the fourth. Here we leave out the clef of *fa*, and retain that of *ut*. We have now gained another third above, and lost it below.

By continuing these alterations from line to line, we pass successively thro' four different positions of the clef of *ut*. Having arrived at that of *sol*, we find it placed upon the second line, and then upon the first. This position includes the five highest lines, and gives the sharpest diapason which the clefs can signify.

The reader may see in Rousseau's Musical Dictionary, Plate A. fig. 5. this succession of clefs from the

lowest to the highest; which in all constitutes eight staves, clefs, or different positions of clefs.

Whatever may be the character and genius of any voice or instrument, if its extent above or below does not surpass that of the general claviary, in this number may be found a station and a clef suitable to it; and there are, in reality, clefs determined for all the parts in music. If the extent of a part is very considerable, so that the number of lines necessary to be added above or below may become inconvenient, the clef is then changed in the course of the music. It may be plainly perceived by the figure, what clef it is necessary to change, for raising or depressing any part, under whatever clef it may be actually placed.

It will likewise appear, that in order to adjust one clef to another, both must be compared by the general claviary, by means of which we may determine, what every note under one of the clefs is with respect to the other. It is by this exercise repeated that we acquire the habit of reading with ease all the parts.

From this manœuvre it follows, that we may place whatever note we please of the gammut upon any line or space whatever of the stave, since we have the choice of eight different positions, which is equal to the number of notes in the octave. Thus you may mark a whole tune upon the same line, by changing the clef at each gradation. The 7th fig. of the same plate in Rousseau's Musical Dictionary, to which we formerly referred, shews by the series of clefs the order of the notes, *re, fa, la, ut, mi, sol, si, re*, rising by thirds, although all placed upon the same line. The fig. following represents upon the order of the same clefs the note *ut*, which appears to descend by thirds upon all the lines of the stave; and further, which yet, by means of changing the clef, still preserves its unison. It is upon such examples as this, that scholars ought to exercise themselves, in order to understand at the first glance the powers of all the clefs, and their simultaneous effect.

There are two of their positions, *viz.* the clef of *sol* upon the first line, and that of *fa* upon the third, which seem daily to fall more and more into disuse. The first of these may seem less necessary, because it produces nothing but a position entirely similar to that of *fa* upon the fourth line, from which however it differs by two octaves. As to the clef of *fa*, it is plain, that in removing it entirely from the third line, we shall no longer have any equivalent position, and that the composition of the claviary, which is at present complete, will by these means become defective.

This much for Rousseau's account of clefs. He proceeds to explain their transposition; but as this would render the present article too long and intricate, we remit the curious to his *Musical Dictionary*, vol. 1. page 162. See also Malcom's *Dissertation on Music*.

CLEFT, in a general sense, is a space made by the separation of parts. Green timber is very apt to split and cleave in several places, after it is wrought into form; and these cracks in it are very disagreeable to the sight. The common method of the country carpenters is to fill up these cracks with a mixture of greafe and saw-dust; but the neatest way of all is, the

the foaking both sides well with the fat of beef-broth, and then dipping pieces of sponge into the same broth, and filling up all the cracks with them: they swell out so as to fill the whole crack; and accommodate themselves so well to it, that the deficiency is hardly seen.

CLEFTS, or *Cracks*, in farriery, appear on the bough of the palsterns, and are caused by a sharp and malignant humour. See FARRIERY, sect. xxxiii.

CLEMA, in antiquity, a twig of the vine, which served as a badge of the Centurion's office.

CLEMATIS, VIRGIN'S-BOWER; a genus of the polygynia order, belonging to the polyandria class of plants. There are twelve species, all of which, except two, are shrubby, climbing plants, very hardy, and adorned with quadrupetalous flowers of red, blue, purple, white, and greenish flowers. They are very easily propagated by layers or cuttings. The *vitis alba*, one of the species, is very acrid to the taste, and without any smell. It is frequently used as a caustic, and for cleansing old ulcers. The root is said to be purgative. The leaves of all the species bruised and applied to the skin, burn it into carbuncles as in the plague; and if applied to the nostrils in a sultry day immediately after being cropped, will cause the same uneasy sensation as a flame applied to that part would occasion. Hence the title of *flammula*, or "little flame," by which this genus of plants was formerly distinguished.

CLEMENS ROMANUS, bishop of Rome, where he is said to have been born; and to have been fellow labourer with St Peter and St Paul. We have nothing remaining of his works that is clearly genuine, excepting one epistle, written to quiet some disturbances in the church of Corinth; which, next to holy writ, is esteemed one of the most valuable remains of ecclesiastical antiquity.

CLEMENS *Alexandrinus*, so called to distinguish him from the former; was an eminent father of the church, who flourished at the end of the second and beginning of the third centuries. He was the scholar of Pantænus, and the instructor of Origen. The best edition of his works is that in 2 vols folio, published in 1715, by archbishop Potter.

CLEMENT V. (pope), the first who made a public sale of indulgences. He transplanted the holy see to Avignon in France; greatly contributed to the suppression of the knights templars; and was author of a compilation of the decrees of the general councils of Vienna, styled *Clementines*. He died in 1314.

CLEMENT VII. (Julius de Medicis), pope, memorable for his refusing to divorce Catharine of Arragon from Henry VIII.; and for the bull he published upon the king's marriage with Anne Boleyn; which, according to the Romish authors, lost him England. He died in 1534.

CLEMENT XIV. (Francis Laurentius Ganganelli), the late pope, was born at St Angelo in the duchy of Urbino, in October 1705; and chosen pope, though not yet a bishop, in 1769: at which time the see of Rome was involved in a most disagreeable and dangerous contest with the house of Bourbon. His reign was rendered troublesome by the collision of parties on the affairs of the Jesuits; and it is pretended that

his latter days were embittered by the apprehensions of poison. Though this report was probably apocryphal, it is said that he often complained of the heavy burden which he was obliged to bear; and regretted, with great sensibility, the loss of that tranquillity which he enjoyed in his retirement when only a simple Franciscan. He was, however, fortunate in having an opportunity, by a single act, to distinguish a short administration of five years in such a manner as will ever prevent its sinking into obscurity. His death was immediately attributed to poison, as if an old man of 70, loaded with infirmities and disorders, could not quit the world without violence. His proceedings against the Jesuits furnished a plausible pretence for this charge; and the malevolence of their enemies embellished it with circumstances. It even seems as if the ministers of those powers who had procured their dissolution did not think it beneath them to countenance the report; as if falsehood was necessary to prevent the revival of a body which had already sunk in its full strength, under the weight of real misconduct. The charge was the more ridiculous, as the Pontiff had undergone a long and painful illness, which originally proceeded from a suppression of urine, to which he was subject; yet the report was propagated with the greatest industry: and though the French and Spanish ministers were present at the opening of his body, the most horrible circumstances were published relative to that operation. It was confidently told that the head fell off from the body, and that the stench poisoned and killed the operators. It availed but little that the operators shewed themselves alive and in good health, and that the surgeons and physicians proved the falsehood of every part of the report. Clement XIV. appears to have been a man of a virtuous character, and possessed of considerable abilities. He died much regretted by his subjects.

CLENARD (Nicholas), a celebrated grammarian in the 16th century, was born at Dieff; and after having taught humanity at Louvain, travelled into France, Spain, Portugal, and Africa. He wrote in Latin, 1. Letters relating to his Travels, which are very curious and scarce. 2. A Greek Grammar, which has been revised and corrected by many grammarians; and other works. He died at Grenoble, in 1542.

CLEOBULUS, son of Evagoras, and one of the Grecian sages; he was valiant, a lover of learning, and an enemy to vice. Flourished about 560 years before Christ.

CLEOME, in botany, a genus of the filiquosa order, belonging to the tetradynamia class of plants. There are 15 species; all of them, except two, natives of warm climates. They are herbaceous plants rising from one to two feet high; and are adorned with flowers of various colours, as red, yellow, flesh colour, &c. They are propagated by seeds, and require no other care than what is common to other exotics which are natives of warm countries.

CLEOMENES, the name of three Lacedæmonian kings. See LACEDÆMON.

CLEOPATRA, the celebrated queen of Egypt, was daughter of Ptolemy Auletes. By her extraordinary beauty, she subdued the two renowned Roman

Cleostratus
Clepsydra.

generals Julius Cæsar and Marc Antony: the latter of whom, it is thought, lost the empire of Rome by his attachment to her. At length, Marc Antony being subdued by Octavius Cæsar, he tried the force of her declining charms upon the conqueror, but in vain; upon which, expecting no mercy from him, she poisoned herself, 30 years before Christ. According to some authors, she was the restorer of the Alexandrian library, to which she added that of Pergamos; and it is said, that she studied philosophy, to console her for the absence of Antony. With her death ended the family of the Ptolemies in Egypt, after it had reigned from the death of Alexander 294 years: for Egypt, after this, was reduced to a Roman province; in which dependence it remained, till it was taken from them by the Saracens, *A. D. 641*.

CLEOSTRATUS, a celebrated astronomer born at Tenedos, was, according to Pliny, the first who discovered the signs of the Zodiac; others say, that he only discovered the signs Aries and Sagittarius. He also corrected the errors of the Grecian year about the 306th before Christ.

CLEPSYDRA, an instrument or machine serving to measure time by the fall of a certain quantity of water.

The word comes from *κλεψύδρα, κενδο, ἰδρυ, aqua*, water; though there have likewise been clepsydræ made with mercury.

The Egyptians, by this machine, measured the course of the sun. Tycho Brahe, in our days, made use of it to measure the motion of the stars, &c. and Dredley used the same contrivance in making all his maritime observations. The use of clepsydra is very ancient: they were invented in Egypt under the Ptolemies; as were also sun-dials. Their use was chiefly in the winter; the sun-dials served in the summer. They had two great defects: the one, that the water ran out with a greater or less facility, as the air was more or less dense; the other, that the water ran more readily at the beginning, than towards the conclusion. M. Amontons has invented a clepsydra free from both these inconveniences; and which has these three grand advantages, of serving the ordinary purpose of clocks, of serving in navigation for the discovery of the longitude, and of measuring the motion of the arteries.

Construction of a CLEPSYDRA. To divide any cylindric vessel into parts to be emptied in each division of time; the time wherein the whole, and that wherein any part is to be evacuated, being given.

Suppose, *v. gr.* a cylindric vessel, whole charge of water flows out in twelve hours, were required to be divided into parts to be evacuated each hour. 1. As the part of time 1, is to the whole time 12; so is the same time 12 to a fourth proportional, 144. 2. Divide the altitude of the vessel into 144 equal parts: here the last will fall to the last hour; the three next above to the last part but one; the five next to the tenth hour, &c.; lastly, the 23 last to the first hour. For since the times increase in the series of the natural numbers 1, 2, 3, 4, 5, &c. and the altitudes, if the numeration be in retrograde order from the twelfth hour, increase in the series of the unequal numbers 1, 3, 5, 7, 9, &c. the altitude, computed from the twelfth

hour, will be as the squares of the times 1, 4, 9, 16, 25, &c. therefore the square of the whole time 144, comprehends all the parts of the altitude of the vessel to be evacuated. But a third proportional to 1 and 12 is the square of 12, and consequently it is the number of equal parts into which the altitude is to be divided, to be distributed according to the series of the unequal numbers, through the equal interval of hours. Since in lieu of parts of the same vessel, other less vessels equal thereto may be substituted; the altitude of a vessel emptied in a given space of time being given, the altitude of another vessel to be emptied in a given time may be found; *viz.* by making the altitudes as the squares of the times.

CLERC (John le), a most celebrated writer and universal scholar, born at Geneva in 1657. After he had passed through the usual course of study at Geneva, and had lost his father in 1676, he went to France in 1678; but returning the year after, he was ordained with the general applause of all his examiners. In 1682, le Clerc visited England with a view to learning the language. He preached several times in the French churches in London, and visited several bishops and men of learning; but the smoky air of the town not agreeing with his lungs, he returned to Holland, within the year, where he at length settled. He preached before a synod held at Rotterdam by the remonstrants in 1684; and was admitted professor of Philosophy, polite literature, and the Hebrew tongue, in their school at Amsterdam. The remainder of his life affords nothing but the history of his works, and of the controversies he was engaged in; but these would lead into too extensive a detail. He continued to read regular lectures; and because there was no single author full enough for his purpose, he drew up and published his *Logic*, *Ontology*, *Pneumatology* and *Natural Philosophy*. He published *Art Critica*; a Commentary on the Old Testament; a Compendium of Universal History; an Ecclesiastical History of the two first Centuries; a French Translation of the New Testament, &c. In 1686, he began, jointly with M. de la Croix, his *Bibliothèque Universelle et Historique*, in imitation of other literary journals; which was continued to the year 1693, inclusive, in 26 vols. In 1703, he began his *Bibliothèque Choisie*, and continued it to 1714, and then commenced another work on the same plan called *Bibliothèque ancienne et moderne*, which he continued to the year 1728; all of them justly deemed excellent stores of useful knowledge. In 1728, he was seized with a palsy and fever; and, after spending the last six years of his life with little or no understanding, died in 1736.

CLERC (Sebastian le), engraver and designer in ordinary to the French king, was born at Metz in 1637. After having learnt designing, he applied himself to mathematics, and was engineer to the marshal de la Ferté. He went to Paris in 1665, where he applied himself to designing and engraving with such success, that M. Colbert gave him a pension of 600 crowns. In 1672, he was admitted into the royal academy of painting and sculpture; and in 1680 was made professor of geometry and perspective in the same academy. He published, besides a great number of designs and prints, 1. A Treatise on theoretical and practical

Clerc.

Clergy. practical Geometry, A Treatise on Architecture, and other works; and died in 1714. He was an excellent artist, but chiefly in the petit style. He immortalized Alexander, and Lewis XIV. in miniature. His genius seldom exceeds the dimensions of six inches. Within those limits he could draw up 20,000 men with great dexterity. No artist except Callot and Della Bella, could touch a small figure with so much spirit.

CLERGY, a general name given to the body of ecclesiastics of the Christian church, in contradistinction to the laity. See **LAITY**.

The distinction of Christians into clergy and laity, was derived from the Jewish church, and adopted into the Christian by the apostles themselves: whenever any number of converts was made, as soon as they were capable of being formed into a congregation or church, a bishop or presbyter, with a deacon, were ordained to minister to them. Of the bishops, priests, and deacons, the clergy originally consisted; but in the third century, many inferior orders were appointed, as subservient to the office of deacon, such as **ACOLUTHISTS**, **READERS**, &c.

Black ft. Comment. This venerable body of men being separate and set apart from the rest of the people, in order to attend the more closely to the service of Almighty God, have therefore large privileges allowed them by our municipal laws: and had formerly much greater, which were abridged at the time of the reformation, on account of the ill use which the Popish clergy had endeavoured to make of them. For, the laws having exempted them from almost every personal duty, they attempted a total exemption from every secular tie. But it is observed by Sir Edward Coke, that as the overflowing of waters doth many times make the river to lose its proper channel, so, in times past, ecclesiastical persons, seeking to extend their liberties beyond their due bounds, either lost, or enjoyed not those which of right belonged to them. The personal exemptions do indeed for the most part continue: a clergyman cannot be compelled to serve on a jury, nor to appear at a court-leet, or view of frank-pledge, which almost every other person is obliged to do: but if a layman is summoned on a jury, and before the trial takes orders, he shall notwithstanding appear and be sworn. Neither can he be chosen to any temporal office, as bailiff, reeve, constable, or the like; in regard of his own continual attendance on the sacred function. During his attendance on divine service, he is privileged from arrests in civil suits. In cases also of felony, a clerk in orders shall have the benefit of his clergy, without being branded in the hand; and may likewise have it more than once: in both which particulars he is distinguished from a layman. But, as they have their privileges, so they have also their disabilities, on account of their spiritual vocations. Clergymen are incapable of sitting in the house of commons; and by statute 21 Hen. VIII. c. 13. are not in general allowed to take any lands or tenements to farm, upon pain of 10*l.* per month, and total avoidance of the lease; nor, upon like pain, to keep any tap-house or brew-house; nor shall engage in any manner of trade, nor sell any merchandize, under forfeiture of the treble value. Which prohibition is consonant to the canon law.

Benefit of CLERGY, is an ancient privilege whereby one in orders claimed to be delivered to his ordinary to purge himself of felony.

After trial and conviction* of a criminal, the judgment of the court regularly follows, unless suspended or arrested by some intervening circumstance; of which the principal is *benefit of clergy*: a title of no small curiosity as well as use, and concerning which, therefore, it may not be improper to inquire, 1. Into its original, and the various mutations which this privilege of the clergy has sustained. 2. To what persons it is to be allowed at this day. 3. In what cases. 4. The consequences of allowing it.

I. Clergy, the *privilegium clericale*, or (in common speech) the benefit of clergy, had its original from the pious regard paid by Christian princes to the church in its infant state, and the ill use which the popish ecclesiastics soon made of that pious regard. The exemptions which they granted to the church were principally of two kinds: 1. Exemption of places consecrated to religious duties from criminal arrests; which was the foundation of sanctuaries. 2. Exemption of the persons of clergymen from criminal process before the secular judge in a few particular cases; which was the true original and meaning of the *privilegium clericale*.

But the clergy increasing in wealth, power, honour, number, and interest, soon began to set up for themselves; and that which they obtained by the favour of the civil government, they now claimed as their inherent right, and as a right of the highest nature, indefeasible, and *jure divino*. By their canons, therefore, and constitutions, they endeavoured at, and where they met with easy princes, obtained, a vast extension of those exemptions; as well in regard to the crimes themselves, of which the list became quite universal, as in regard to the persons exempted, among whom were at length comprehended, not only every little subordinate officer belonging to the church or clergy, but even many that were totally laymen.

In England, however, although the usurpations of the pope were very many and grievous, till Henry VIII. totally exterminated his supremacy, yet a total exemption of the clergy from secular jurisdiction could never be thoroughly effected, though often endeavoured by the clergy: and therefore, though the ancient *privilegium clericale* was in some capital cases, yet it was not universally allowed. And in those particular cases, the use was for the bishop or ordinary to demand his clerks to be remitted out of the king's courts as soon as they were indicted: concerning the allowance of which demand there was for many years a great uncertainty: till at length it was finally settled in the reign of Henry VI. that the prisoner should first be arraigned; and might either then claim his benefit of clergy by way of dedynatory plea; or, after conviction, by way of arrest of judgment. This latter way is most usually practised, as it is more to the satisfaction of the court to have the crime previously ascertained by confession or the verdict of a jury; and also it is more advantageous to the prisoner himself, who may possibly be acquitted, and so need not the benefit of his clergy at all.

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Originally the law was held that no man should be admitted to the benefit of clergy, but such as had the *habitus et tonsuram clericalem*. But, in process of time, a much wider and more comprehensive criterion was established; every one that could read (a great mark of learning in those days of ignorance and her sister superstition) being accounted a clerk, or *clericus*, and allowed the benefit of clerkship, though neither initiated in clerkship, nor trimmed with the holy tonsure. But when learning, by means of the invention of printing, and other concurrent causes, began to be more generally disseminated than formerly; and reading was no longer a competent proof of clerkship, or being in holy orders; it was found that as many laymen as divines were admitted to the *privilegium clericale*: and therefore by statute 4 Hen. VII. c. 13. a distinction was once more drawn between mere lay scholars, and clerks that were really in orders. And, though it was thought reasonable still to mitigate the severity of the law with regard to the former, yet they were not put upon the same footing with actual clergy; being subjected to a slight degree of punishment, and not allowed to claim the clerical privilege more than once. Accordingly the statute directs, that no person, once admitted to the benefit of clergy shall be admitted thereto a second time, until he produces his orders: and, in order to distinguish their persons, all laymen who are allowed this privilege, shall be burned with a hot-iron in the brawn of the left thumb. This distinction between learned laymen and real clerks in orders was abolished for a time by the statutes 28 Hen. VIII. c. 1. and 32 Hen. VIII. c. 3.; but is held to have been virtually restored by statute 1 Edw. VI. c. 12. which statute also enacts, that lords of parliament and peers of the realm may have the benefit of their peerage, equivalent to that of clergy, for the first offence, (although they cannot read, and without being burnt in the hand), for all offences then clergyable to commoners, and also for the crimes of house-breaking, highway-robbery, horse-stealing, and robbing of churches.

After this burning, the laity, and before it the real clergy, were discharged from the sentence of the law in the king's courts, and delivered over to the ordinary, to be dealt with according to the ecclesiastical canons. Whereupon the ordinary, not satisfied with the proofs adduced in the profane secular court, set himself formally to make a purgation of the offender by a new canonical trial; although he had been previously convicted by his country, or perhaps by his own confession. This trial was held before the bishop in person, or his deputy; and by a jury of twelve clerks: And there, first, the party himself was required to make oath of his own innocence: next, there was to be the oath of twelve compurgators, who swore they believed he spoke the truth: then, witnesses were to be examined upon oath, but on behalf of the prisoner only: and lastly, the jury were to bring in their verdict upon oath, which usually acquitted the prisoner; otherwise, if a clerk, he was degraded, or put to penance. A learned judge in the beginning of last century, remarks with much indignation the vast complication of perjury and subornation of perjury in this solemn farce of a mock trial:

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the witnesses, the compurgators, and the jury, being all of them partakers in the guilt: the delinquent party also, though convicted in the clearest manner, and conscious of his own offence, yet was permitted, and almost compelled to swear himself not guilty; nor was the good bishop himself, under whose countenance this scene was transacted, by any means exempt from a share of it. And yet, by this purgation, the party was restored to his credit, his liberty, his lands, and his capacity of purchasing afresh, and was entirely made a new and an innocent man.

This scandalous prostitution of oaths, and the forms of justice, in the almost constant acquittal of felonious clerks by purgation, was the occasion, that, upon very heinous and notorious circumstances of guilt, the temporal courts would not trust the ordinary with the trial of the offender, but delivered over to him the convicted clerk, *abique purgatione faciendo*: in which situation the clerk convicted could not make purgation; but was to continue in prison during life, and was incapable of acquiring any personal property, or receiving the profits of his lands, unless the king should please to pardon him. Both these courses were in some degree exceptionable; the latter perhaps being too rigid, as the former was productive of the most abandoned perjury. As therefore these mock trials took their rise from factious and popish tenets, tending to exempt one part of the nation from the general municipal law; it became high time, when the reformation was thoroughly established, to abolish so vain and impious a ceremony.

Accordingly the statute 18 Eliz. c. 7. enacts, that, for the avoiding such perjuries and abuses, after the offender has been allowed his clergy, he shall not be delivered to the ordinary as formerly; but, upon such allowance, and burning of the hand, he shall forthwith be enlarged and delivered out of prison; with proviso, that the judge may, if he thinks fit, continue the offender in goal for any time not exceeding a year. And thus the law continued unaltered for above a century; except only, that the statute 21 Jac. I. c. 6. allowed, that women convicted of simple larcenies under the value of 10s. should (not properly have the benefit of clergy, for they were not called upon to read; but) be burned in the hand, whipped, or stocked, or imprisoned for any time not exceeding a year. And a similar indulgence by the statutes 3 and 4 W. and M. c. 9. and 4 and 5 W. and M. c. 24. was extended to women guilty of any clergyable felony whatever; who were allowed once to claim the benefit of the statute, in like manner as men might claim the benefit of clergy, and to be discharged upon being burned in the hand, and imprisoned for any time not exceeding a year. All women, all peers, and all male commoners who could read, were therefore discharged in such felonies absolutely, if clerks in orders; and for the first offence upon burning in the hand, if lay; yet all liable, (except peers), if the judge saw occasion, to imprisonment not exceeding a year. And these men who could not read, if under the degree of peerage, were hanged.

Afterwards, indeed, it was considered, that education and learning were no extenuations of guilt, but quite the reverse: and that if the punishment of death

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for simple felony was too severe for those who had been liberally instructed, it was, *a fortiori*, too severe for the ignorant also. And thereupon, by statute 5 Anne, c. 6. it was enacted that the benefit of clergy should be granted to all those who were entitled to ask it, without requiring them to read by way of conditional merit. And, experience having shewn that so universal a lenity was frequently inconvenient, and an encouragement to commit the lower degrees of felony; and that though capital punishments were too rigorous for these inferior offences, yet no punishment at all, (or next to none, as branding or whipping), was as much too gentle; it was enacted by the same statute 5 Anne, c. 6. that when any person is convicted of any theft or larceny, and burnt in the hand for the same, he shall, at the discretion of the judge, be committed to the house of correction or public work-house, to be there kept to hard labour for any time not less than six months, and not exceeding two years; with a power of inflicting a double confinement in case of the party's escape from the first. And it is also enacted by the statutes 4 Geo. I. c. 11. and 6 Geo. I. c. 23. that when any persons shall be convicted of any larceny, either grand or petit, or any felonious stealing or taking of money or goods and chattels, either from the person or the house of any other, or in any other manner, and who by the law shall be entitled to the benefit of clergy, and liable only to the penalties of burning in the hand, or whipping; the court, in their discretion, instead of such burning in the hand, or whipping, may direct such offenders to be transported to America for seven years; and if they return, or are seen at large in this kingdom within that time, it shall be felony without benefit of clergy.

In this state does the benefit of clergy at present stand; very considerably different from its original institution: the wisdom of the English legislature having, in the course of a long and laborious process, extracted, by a noble alchemy, rich medicines out of poisonous ingredients; and converted, by gradual mutations, what was at first an unreasonable exemption of particular popish ecclesiastics, into a merciful mitigation of the general law with respect to capital punishments.

From the whole of this detail, we may collect, that however, in times of ignorance and superstition, that monster in true policy may for a while subsist, of a body of men residing in a state, and yet independent of its laws; yet when learning and rational religion have a little enlightened mens minds, society can no longer endure an absurdity so gross, as must destroy its very fundamentals. For, by the original contract of government, the price of protection by the united force of individuals, is that of obedience to the united will of the community. This united will is declared in the laws of the land: and that united force is exerted in their due, and universal, execution.

II. We are next to inquire, to what persons the benefit of clergy is to be allowed at this day: and this must chiefly be collected from what has been observed in the preceding article. For, upon the whole, we may pronounce, that all clerks in orders are; without any branding, and of course without any transportation, (for that is only substituted in lieu of the

other,) to be admitted to this privilege, and immediately discharged, or at most only confined for one year; and this as often as they offend. Again, all lords of parliament, and peers of the realm, by the statute 1 Edw. VI. c. 12. shall be discharged in all clergyable and other felonies provided for by the act without any burning in the hand, in the same manner as real clerks convicted: but this is only for the first offence. Lastly, all the commons of the realm, not in orders, whether male or female, shall, for the first offence, be discharged of the punishment of felonies, within the benefit of clergy, upon being burnt in the hand, and suffering discretionary imprisonment; or, in case of larceny, upon being transported for seven years, if the court shall think proper.

III. The third point to be considered is, for what crimes the *privilegium clericale*, or benefit of clergy, is to be allowed. And it is to be observed, that neither in high treason, nor in petit larceny, nor in any mere misdemeanors, it was indulged at the common law: and therefore we may lay it down as a rule, that it was allowable only in petit treason, and capital felonies; which for the most part became legally entitled to this indulgence, by the statute *de clero*, 25 Edw. III. stat. 3. c. 4. which provides, that clerks convicted for treason or felonies, touching other persons than the king himself or his royal majesty, shall have the privilege of holy church. But yet it was not allowed in all cases whatsoever: for in some it was denied even in common law, viz. *insidiatio viarum*, or lying in wait for one on the highway; *depopulation agrorum*, or destroying and ravaging a country; and *combustio domorum*, or arson, that is, burning of houses; all which are a kind of hostile acts, and in some degree border upon treason. And farther, all these identical crimes, together with petit treason, and very many other acts of felony, are ousted of clergy by particular acts of parliament.

Upon the whole, we may observe the following rules. 1. That in all felonies, whether new created, or by common law, clergy is now allowable, unless taken away by act of parliament. 2. That where clergy is taken away from the principal, it is not of course taken away from the accessory, unless he be also particularly included in the words of the statute. 3. That when the benefit of clergy is taken away from the offence, (as in case of murder, huggery, robbery, rape, and burglary), a principal in the second degree, being present, aiding and abetting the crime, is as well excluded from his clergy as he that is a principal in the first degree: but, 4. That where it is only taken away from the person committing the offence (as in the case of stabbing, or committing larceny in a dwelling-house), his aiders and abettors are not excluded, through the tenderness of the law which hath determined that such statutes shall not be taken literally.

IV. Lastly, We are to inquire what the consequences are to the party, of allowing him this benefit of clergy. We speak not of the branding, imprisonment, or transportation; which are rather concomitant conditions, than consequences, of receiving this indulgence. The consequences are such as affect his present interest, and future credit and capacity: as having been once a felon, but now purged from that guilt

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guilt by the privilege of clergy; which operates as a kind of statute pardon. And we may observe, 1. That, by his conviction, he forfeits all his goods to the king; which, being once vested in the crown, shall not afterwards be restored to the offender. 2. That, after conviction, and till he receives the judgment of the law by branding or the like, or else is pardoned by the king, he is, to all intents and purposes, a felon; and subject to all the disabilities and other incidents of a felon. 3. That, after burning or pardon, he is discharged for ever of that, and all other felonies before committed, within the benefit of clergy; but not of felonies from which such benefit is excluded: and this by statutes 8 Eliz. c. 4. and 18 Eliz. c. 7. 4. That, by the burning, or pardon of it, he is restored to all capacities and credits, and the possession of his lands, as if he had never been convicted. 5. That what is said with regard to the advantages of commoners and laymen, subsequent to the burning in the hand, is equally applicable to all peers and clergymen, although never branded at all. For they have the same privileges, without any burning, to which others are entitled after it.

CLERK (*clericus*), a word formerly used to signify a learned man, or man of letters. The word comes from the Greek *κληρικός*, used for *clergy*; but more properly signifying *lot* or *heritage*, in regard the lot and portion of clerks or ecclesiastics is to serve God. Accordingly, *clerus* was at first used to signify those who had a particular attachment to the service of God. The origin of the expression is derived from the Old Testament, where the tribe of Levi is called the *lot*, *heritage*, *κληρονομία*; and God is reciprocally called *their portion*; by reason that tribe was consecrated to the service of God, and lived on the offerings made to God, without any other settled provision as the rest had.

Thus, Pasquier observes, the officers of the counts (*comites*) were anciently created under the title of *clerks of accounts*; and secretaries of state were called, *clerks of the secret*. So, *clericus domini regis*, in the time of Edward I. was Englished, the *king's secretary*, or *clerk of his council*. The term was applied indifferently to all who made any profession of learning; or who knew how to manage the pen: though originally it was appropriated to ecclesiastics. As the nobility and gentry were usually brought up to the exercise of arms, there was none but the clergy left to cultivate the sciences: hence, as it was the clergy alone who made any profession of letters, a very learned man came to be called a *great clerk*; and a stupid ignorant man, a *bad clerk*.

CLERK is also applied to such as by their course of life exercise their pens in any court or office, of which there are various kinds: thus,

CLERK of the *Bails*, an officer in the court of king's bench, whose business is to file all bail-pieces taken in that court, where he always attends.

CLERK of the *Check*, an officer belonging the king's court, so called, because he has the check and controulment of the yeomen that belong to the king, queen, or prince. He likewise, by himself or deputy, sets the watch in the court. There is also an officer in the navy of the same name, belonging to the king's yards.

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CLERK of the *Crown*, an officer in the king's bench, who frames, reads, and records all indictments against offenders, there arraigned or indicted of any public crime. He is likewise termed *clerk of the crown-office*, in which capacity he exhibits information by order of the court, for divers offences.

CLERK of the *Crown*, in chancery, an officer whose business it is constantly to attend the lord chancellor, in person or by deputy; to write and prepare for the great seal special matters of state by commission, both ordinary and extraordinary, viz. commissions of lieutenancy, of justices of assize,oyer and terminer, goal-delivery, and of the peace; all general pardons, granted either at the king's coronation, or in parliament: the writs of parliament, with the names of the knights, citizens, and burgesses, are also returned into his office. He also makes out special pardons and writs of execution on bonds of statute-staple forfeited.

CLERK of the *Deliveries*, an officer of the tower, whose function is to take indentures for all stores and ammunition issued from thence.

CLERK of the *Errors*, in the court of common pleas, an officer who transcribes and certifies into the king's bench, the tenor of the record of the action on which the writ of error, made out by the curfitor, is brought there to be determined. In the king's bench, the clerk of the errors transcribes and certifies the records of causes, by bill, in that court, into the exchequer. And the business of the clerk of the errors in the exchequer, is to transcribe the records certified thither out of the king's bench, and to prepare them for judgment in the exchequer-chamber.

CLERK of the *Essoins*, in the court of common pleas, keeps the essoin-roll, or enters essoins: he also provides parchment, cuts it into rolls, marks the number on them, delivers out all the rolls to every officer, and receives them again when written. See *Essoin*.

CLERK of the *Escheats*, an officer in the exchequer, who every term receives the escheats out of the lord-treasurer's remembrancer's office, and writes them out, to be levied for the crown.

CLERK of the *Green-cloth*. See *GREEN-CLOTH*.

CLERK of the *Hamper*, or *Hanaper*, an officer in chancery, whose business is to receive all money due to the king for the seals of charters, letters patent, commissions, and writs; also the fees due to the officers for enrolling and examining them.

CLERK-Comptroller of the *King's Household*, an officer of the king's court, authorised to allow or disallow the charges of pursuivants, messengers of the green-cloth, &c. to inspect and controul all defects of any of the inferior officers; and to fit in the counting-house with the lord-steward and other officers of the household, for regulating such matters.

CLERK of the *King's Silver*, an officer of the common pleas, to whom every fine is brought, after it has passed the office of the *enfos brevium*; and who enters the effect of writs of covenant, into a book kept for that purpose, according to which all the fines of that term are recorded in the rolls of the court.

CLERK of the *Market*, an officer of the king's house, to whom is given the charge of the king's measures and weights, the standards of those that ought to be used all over England.

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CLERK of the Nichils, or Nihilis, an officer of the exchequer, who makes a roll of all such sums as are nichilled by the sheriffs upon their estreats of green wax, and delivers them in to the remembrancer of the treasury, to have execution done upon them for the king. See **NIHIL**.

CLERK of the Outlawries, an officer of the common pleas, and deputy to the attorney-general, for making out all writs of *capias inlagatum*, after outlawry, to which there must be the king's attorney's name.

CLERK of the Paper-office, an officer belonging to the king's bench, whose business is to make up the paper-books of special pleadings in that court.

CLERK of the Peace, an officer belonging to the sessions of the peace, whose business is to read indictments, inrol the proceedings, and draw the process: he likewise certifies into the king's bench, transcripts of indictments, outlawries, attainders and convictions had before the justices of peace, within the time limited by statute, under a certain penalty. This office is in the gift of the *custos rotulorum*, and may be executed by deputy.

CLERK of the Pellis, an officer that belongs to the exchequer, whose business is to enter every teller's bill into a parchment-roll called *pellis receptorum*; and to make another roll of payments called *pellis exituum*.

CLERK of the petty Bag, an officer of the court of chancery, whereof there are three, the master of the rolls being the chief: their business is to record the return of all inquisitions out of every shire; to make out patents of customers, gaugers, comptrollers, &c. liberates upon extent of statutes-staple, *conge d'elires* for bishops, summons of the nobility, clergy, and burgesses to parliament; and commissions directed to knights and others of every shire, for assessing subsidies and taxes.

CLERK of the Pipe, an officer of the exchequer, who having the accounts of all debts due to the king, delivered out of the remembrancer's office, charges them in a great roll folded up like a pipe. He writes out warrants to sheriffs, to levy the said debts on the goods and chattels of the debtors: and if they have no goods, then he draws them down to the treasurer's remembrancer, to write estreats against their lands.

CLERK of the Pleas, an officer of the exchequer, in whose office all the officers of the court, having special privilege, ought to sue, or be sued, in any action. In this office also actions at law may be prosecuted by other persons, but the plaintiff ought to be tenant or debtor to the king, or some way accountable to him. The under clerks are attorneys in all suits.

CLERKS of the Privy-seal, four officers that attend the lord privy-seal, for writing and making out all things that are sent by warrant from the signet to the privy-seal, and to be passed the great-seal; and likewise to make out privy-seals, upon special occasions of his majesty's affairs, as for loan of money, or the like.

CLERK of the Rolls, an officer of the chancery, whose business is to make searches after, and copies of deeds, officers, &c.

CLERK of the Signet, an officer continually attending upon his majesty's principal secretary, who has the custody of the privy-signet, as well for sealing the king's private letters, as those grants which pass the

king's hand by bill signed. There are four of these officers who have their diet at the secretary's table.

CLERK, or WRITER, to the Signet, in Scots law. See **SCOTS LAW**, title 3.

SIX * CLERKS, officers in chancery, next in degree below the twelve masters, whose business is to inrol commissions, pardons, patents, warrants, &c. which pass the great-seal; they were anciently *clerici*, and forfeited their places if they married. There are also attorneys for parties in suits depending in the court of chancery.

CLERK of the Treasury, an officer belonging to the court of common pleas, who has the charge of keeping the records of the court, makes out all records of *nisi prius*, and likewise all exemplifications of records being in the treasury. He has the fees due for all searches; and has under him an under-keeper, who always keeps one key of the treasury-door.

CLERK of the Warrants, an officer of the common pleas, whose business is to enter all warrants of attorney for plaintiffs and defendants in suit; and to inrol deeds of bargain and sale, that are acknowledged in court, or before a judge. His office is likewise to estreat into the exchequer all issues, fines, estreats, and amercements, which grow due to the crown in that court.

CLERMONT, a considerable, rich, and populous town of France, in Auvergne, with a bishop's see. The cathedral, the public squares, and the walks, are very fine. Here is a bridge naturally formed, as they pretend, by the petrifying quality of a fountain. E. Long. 3. 18. N. Lat. 45. 47.

CLEROMANCY, a sort of divination performed by throwing lots, which were generally black and white beans, little clods of earth, or pebbles; also dice, or such like things, distinguished by certain characters. They cast the lots into a vessel, and having made supplication to the gods to direct them, drew them out, and, according to the characters, conjectured what should happen to them.

CLERVAL, a town of France, in the Franche comté, seated on the river Doux, belonging to the house of Wirtemberg, but depends on the crown of France. E. Long. 5. 57. N. Lat. 46. 35.

CLERVAUX, one of the most celebrated and finest abbeys of France, in Champagne, five miles from Bar-sur-Aube, and seated in a valley surrounded with woods and mountains. It is the chief of the Cistercian order. Here is the famous Ton of St Bernard, which will hold 800 tons of wine. Near this abbey is a small town.

CLETHRA, in botany, a genus of the monogynia order, belonging to the decandria class of plants. There is but one species, viz. the *Alnifolia*. This is a native of Virginia and Carolina, where it grows in moist places, and near the sides of rivulets, rising near eight or ten feet high. The leaves are shaped like those of the alder-tree, but longer: these are placed alternately upon the branches: the flowers are produced in close spikes at the extremities of the branches: they are white, composed of five petals, and have ten stamina in each, nearly of the same length with the petals. This is hardly enough to bear the open air in Britain, and is one of the most beautiful flowering shrubs.

Cleveland
Cliffortia.

shrubs. Its season is commonly about the beginning of July; and, if the season is not very hot, there will be part of the spikes in beauty till the middle of September. This shrub will thrive best in moist land, and requires a sheltered situation, where it may be defended from strong winds, which frequently break off the branches where they are too much exposed to their violence. It is propagated by layers, but they are generally two years before they take root. It may also be propagated by suckers, which are sent out from the roots: if these are carefully taken off with fibres in the autumn, and planted in a nursery-bed, they will be strong enough in two years to transplant where they are to remain.

CLEVELAND, a district in the north riding of Yorkshire in England, from whence the noble family of Fitzroy takes the title of Duke.

CLEVELAND (John), an English poet of some eminence in his time, who during the civil war under Charles I. engaged as a literary champion in the royal cause against the parliamentarians. He died in 1658, and was much extolled by his party. His works, which consist of poems, characters, orations, epistles, &c. were printed in octavo in 1677.

CLEVES, the duchy of, a province of the circle of Westphalia, in Germany. It is divided into two parts by the Rhine, and is about 40 miles in length from east to west, and 20 in breadth from north to south. It is a fine agreeable country, and pretty populous. The towns are, Cleves the capital, Calcar, Gennep, Sauten, Orfey, Bureck, and Greit. These lie on the left side the river. On the right, Duysburg, Welfe, Rees, and Emmerick. There have been great contests about this duchy, but it now belongs to the king of Prussia.

CLEVES, a city of Germany, in the duchy of Cleves, of which it is the capital. It stands upon a pleasant hill, about three miles from the Rhine, with which it communicates, by means of a canal which is large enough for great barges. The castle stands upon a mountain, and, though old, is very agreeable. Calvinists, Lutherans, and Roman Catholics, are all tolerated in this city. E. Long. 5. 36. N. Lat. 51. 40.

CLIENT, among the Romans, a citizen who put himself under the protection of some great man, and, in respect of that relation, was called *patron*.

This patron assisted his client with his protection, interest, and goods; and the client gave his vote for his patron, when he fought any office for himself or his friends. Clients owed respect to their patrons, as these owed them their protection.

The right of patronage was appointed by Romulus, to unite the rich and poor together, in such a manner as that one might live without contempt, and the other without envy; but the condition of a client, in course of time, became little else but a moderate slavery.

CLIENT is now used for a party in a law-suit, who has turned over his cause into the hands of a counsel-lor or solicitor.

CLIFFORTIA, in botany; a genus of the polyandria order, belonging to the diœcia class of plants. There are three species, all of them natives of Africa; so require to be kept in a green-house when cultivated

in this country. Their flowers make no great appearance; but the plants themselves are very ornamental evergreens. They grow to the height of four or five feet; and are propagated by cuttings, which must be young shoots of five or six inches length. If these are planted in pots in spring or summer, and plunged in a hot-bed, they will readily take root. They must be watered plentifully in summer, but very sparingly in winter.

CLIMACTERIC, among physicians, (from *climacter*, a ladder,) a critical year in a person's life.

According to some, this is every seventh year; but others allow only those years produced by multiplying 7 by the odd number 3, 5, 7, and 9, to be climacterical. These years, they say, bring with them some remarkable change with respect to health, life, or fortune: the grand climacteric is the 63^d year; but some, making two, add to this the 81st: the other remarkable climacterics are the 7th, 21st, 35th, 49th, and 56th.

CLIMATE, CLIMA, or CLIME, in geography, a part of the surface of the earth, bounded by two circles parallel to the equator; and of such a breadth, as that the longest day in the parallel nearer the pole, exceeds the longest day in that next the equator by some certain spaces; viz. half an hour. The word comes from the Greek *κλίμα*, *inclinationum*, an inclination.

The Beginning of the CLIMATE, is a parallel circle wherein the day is the shortest. The End of the CLIMATE, is that wherein the day is the longest. The climates therefore are reckoned from the equator to the pole; and are so many bands, or zones, terminated by lines parallel to the equator: though, in strictness, there are several climates in the breadth of one zone. Each climate only differs from its contiguous ones, in that the longest day in summer is longer or shorter by half an hour in the one place than in the other. As the climates commence from the equator, the first climate at its beginning has its longest day precisely 12 hours long; at its end, 12 hours and an half: the second, which begins where the first ends, viz. at 12 hours and an half, ends at 13 hours; and so of the rest, as far as the polar circles, where, what the geographers call *hour-climates* terminate, and *month-climates* commence. As an hour-climate is a space comprised between two parallels of the equator, in the first of which the longest day exceeds that in the latter by half an hour; so the month-climate is a space terminated between two circles parallel to the polar circles, whose longest day is longer or shorter than that of its contiguous one by a month or 30 days.

The ancients, who confined the climates to what they imagined the habitable parts of the earth, only allowed of seven. The first they made to pass through Mevoe, the second through Sienna, the third through Alexandria, the fourth through Rhodes, the fifth through Rome, the sixth through Pontus, and the seventh through the mouth of the Borythenes. The moderns, who have failed further toward the poles, make 30 climates on each side; and, in regard the obliquity of the sphere makes a little difference in the length of the longest day, instead of half an hour, some of them only make the difference of climates a quarter.

Climate.
Climate.

Vulgarly the term *climate* is bestowed on any country or region differing from another either in respect of the seasons, the quality of the soil, or even the manners of the inhabitants; without any regard to the length of the longest day. Abulfeda, an Arabic author, distinguishes the first kind of climates by

the term *real climates*, and the latter by that of *apparent climates*. Varenus gives us a table of 30 climates; but without any regard to the refraction. Ricciolus furnishes a more accurate one, wherein the refractions are allowed for; an abstract of which follows:

Middle of Clim.	Longest Day.	Latit.	Middle of Clim.	Longest Day.	Latit.	Middle of Clim.	Latit.	Cont. Light.	North Night.	Cont. Light.	South Night.
I	12 ^h 30	7° 18	VIII	16 ^h 04 ⁸ 15		XV	66° 53	31 ^d	27 ^d	30 ^d	28 ^d
II	13 0 15	36	IX	17 0 53 46		XVI	69 30	62	58	60	59
III	13 30 23	8	X	18 0 57 44		XVII	73 0	93	87	89	88
IV	14 0 29	49	XI	19 0 60 39		XVIII	78 6	124	117	120	118
V	14 30 35	35	XII	20 0 62 44		XIX	84 0	156	148	150	149
VI	15 0 40	32	XIII	22 0 65 10		XX	90 0	188	180	178	177
VII	15 30 44	42	XIV	24 0 65 54							

CLIMAX, or GRADATION, in rhetoric, a figure wherein the word or expression which ends the first member of a period begins the second, and so on; so that every member will make a distinct sentence, taking its rise from the next foregoing, till the argument and period be beautifully finished; as in the following gradation of Dr Tillotson: "After we have practised good actions a while, they become easy; and when they are easy, we begin to take pleasure in them; and when they please us, we do them frequently; and by frequency of acts, a thing grows into a habit; and confirmed habit is a kind of second nature; and so far as any thing is natural, so far it is necessary; and we can hardly do otherwise; nay, we do it many times when we do not think of it."

CLINCH, in the sea-language, that part of a cable which is bended about the ring of the anchor, and then seized or made fast.

CLINCHING, in the sea-language, a kind of slight caulking used at sea, in a prospect of foul weather, about the posts: it consists in driving a little oakum into their seams, to prevent the water coming in at them.

CLINIC, a term applied by the ancient church-historians to those who received baptism on their death-bed. See BAPTISM.

CLINIC *Medicine*, was particularly used for the method of visiting and treating sick persons in bed, for the more exact discovery of all the symptoms of their disease.

CLINIAS, a Pythagorean philosopher, and musician, in the 65th Olympiad. He was wont to assuage his passion, being very choleric, by his lyre.

CLINOPODIUM, FIELD-BASIL, a genus of the gymnospermia order, belonging to the didymiaia class of plants. There are six species, all of them herbaceous plants, growing from one to two feet high. They are remarkable only for their strong odour, being somewhat between marjoram and basil.

CLIO, in pagan mythology, the daughter of Jupiter and Mnemosyne, was the muse who presided over history. She is generally represented under the form of a young woman crowned with laurel, holding in her right hand a trumpet, and in her left a book.

CLIO, in zoology, a genus of insects belonging to the order of vermes mollusca. The body is oblong and fitted for swimming; and it has two membranaceous

wings placed opposite to each other. The species are three, principally distinguished by the shape of their vagina, and all natives of the ocean.

CLIPSEUS, in natural history, a name given to the flat depressed centronia, from their resembling a shield. See CENTRONIA.

CLISTHENES, a famous Athenian magistrate, the author of the mode of banishing ambitious citizens by ostracism, or writing their names upon a shell: the intention was patriotic, but it was abused like all other human institutions; some of the worthiest citizens of Athens being thus exiled. See ATTICA, n° 79; and OSTRACISM. He died 510 years before Christ.

CLITOMACHUS the philosopher, flourished about 140 years before Christ. He was born at Carthage; quitted his country at 40 years of age; and went to Athens, where he became the disciple and successor of Carneades. He composed many books, but they are all lost.

CLITORIA, in botany; a genus of the decandria order, belonging to the diadelphia class of plants. There are four species, all of them herbaceous perennials, or annuals, of the kidney-bean kind, growing naturally in both the Indies. The stalk is climbing, slender, and of the height of a man. The leaves are winged, placed alternately, and consist of two, three, or five pair of lobes, terminated by an odd one. The flowers, which are elegant, stand singly, each on its proper foot-stalk. They are very large, and generally of a deep blue, but sometimes of a white colour. From the fruit of this plant is distilled an eye-water. The beans reduced to powder, and taken in broth, to the quantity of two drachms, prove a gentle purge; and Grimmer remarks, in his *Labor Ceyl.* that the powder of the dried beans, being mixed with the milk of the cocoa nut, or with broth, and administered in quantity from one to three drachms, not only mitigates colic pains, but is very useful, and much used in Ceylon, in all disorders of the stomach and bowels. These plants are propagated by seeds; and, in this country, must be kept continually in a stove.

CLITORIS, in anatomy, is a part of the external pudenda, situated at the angle which the nymphæ form with each other*. Like the penis it has an erection, * See *Ana-* and it is thought to be the principal seat of venereal *tomy*, pleasure. The clitoris is of different sizes in different n° 372. & women; but in general it is small, and covered with

Clitus
||
Clive.

the labia. The preter-naturally enlarged clitoris is what constitutes an hermaphrodite. When the clitoris is too large, it may be so extirpated as to remove the unnecessary part; but this requires much care, for a farther extirpation subjects the patient to an involuntary discharge of urine.

CLITUS, brother to Alexander the Great's nurse, followed that prince in his conquests, and saved his life by cutting off the hand of Roxaces, which held an ax lifted up to kill him at the passage of the Granicus. Alexander, who had a great regard for him, some time after invited him to supper; when Clitus, at the end of the repast, being heated with wine, diminished the exploits of that prince, in order to magnify those of Philip his father. This so enraged Alexander, that he killed him with his own hand; but he was afterwards so afflicted at it, that he attempted his own life.

CLIVE (Robert) lord, son of Richard Clive Esq; of Styche near Drayton in Salop, was born in 1725. Toward the close of the war in 1741, he was sent as a writer in the East India service, to Madras; but being fonder of the camp than the counting-house, he soon availed himself of an opportunity to exchange his pen for a pair of colours. He first distinguished himself at the siege of Pondicherry in 1748; acted under major Laurence at the taking of Devi Cotta in Tanjore, who wrote of his military talents in high terms; commanded a small party for the taking of Arcot, and afterward defended that place against the French; and performed many other exploits, which, considering the remoteness of the scene of action, would require a long detail to render sufficiently intelligible. He was however, in brief, looked upon and acknowledged as the man who first roused his countrymen to spirited action, and raised their reputation in the East: so that when he came over to England in 1753, he was presented, by the court of directors, with a rich sword set with diamonds, as an acknowledgment of past, and an incitement to future, services. Captain Clive returned to India in 1755, as governor of fort St David, with the rank of lieutenant-colonel in the king's troops; when as commander of the company's troops, he, in conjunction with admiral Watson, reduced Angria the pirate, and became master of Geria his capital, with all his accumulated treasure. On the loss of Calcutta and the well known barbarity of the soubah Surajah Dowla, they failed to Bengal; where they took fort William, in January 1757, and colonel Clive defeating the soubah's army soon after, accelerated a peace. Surajah Dowla's perfidy, however, soon produced fresh hostilities, which ended in his ruin; he being totally defeated by colonel Clive at the famous battle of Plassey. The next day the conqueror entered Muxadabad in triumph; and placed Jaffer Ally Cawn, one of the principal generals on the throne: the deposed soubah was soon after taken, and privately put to death by Jaffer's son. Admiral Watson died at Calcutta; but colonel Clive commanded in Bengal the two succeeding years: he was honoured by the Mogul with the dignity of an Omrah of the empire; and was rewarded by the new soubah with a grant of lands, or a jaghire, producing 27,000l. a-year. In 1760, he returned to England,

where he received the unanimous thanks of the company, was elected member of parliament for Shrewsbury, and was raised to an Irish peerage by the title of Lord Clive Baron of Plassey. In 1764, fresh disturbances taking place in Bengal, lord Clive was esteemed the only man qualified to settle them, and was accordingly again appointed to that presidency; after being honoured with the order of the Bath, and with the rank of major-general. When he arrived in India, he exceeded the most sanguine expectation, in restoring tranquility to the province without striking a blow; and fixed the highest ideas of the British power in the minds of the natives. He returned home in 1767; and, in 1772, when a parliamentary inquiry into the conduct of the East India company was agitated, he entered into an able justification of himself in a masterly speech in the house of commons. He died suddenly towards the close of the year 1774.

CLOACÆ, in antiquity, the common sewers of Rome, to carry off the dirt and soil of the city into the Tiber; justly reckoned among the grand works of the Romans. The first common sewer, called *Cloaca Maxima*, was built by Tarquinius, some say Priscus, others Superbus, of huge blocks of stone joined together without any cement, in the manner of the edifices of those early times; consisting of three rows of arches one above another, which at length conjoin and unite together; measuring in the clear 18 palms in height, and as many in width. Under these arches they rowed in boats; which made Pliny say that the city was suspended in air, and that they sailed beneath the houses. Under these arches also were ways through which carts loaded with hay could pass with ease. It began in the Forum Romanum; measured 300 paces in length; and emptied itself between the temple of Vesta and the Pons Senatorius. There were as many principal sewers as there were hills. Pliny concludes their firmness and strength from their standing for so many ages the shocks of earthquakes, the fall of houses, and the vast loads and weights moved over them.

CLOACINA, the goddess of jokes and common sewers, among the ancient Romans.

CLOCK, a machine constructed in such a manner, and regulated by such uniform movements, as to measure time, and all its subdivisions, with great exactness.

The invention of clocks with wheels is referred to Pacificus, archdeacon of Verona, who lived in the time of Lotharius son of Louis the Debonnaire, on the credit of an epitaph quoted by Ughelli, and borrowed by him from Panvinus. They were at first called nocturnal dials, to distinguish them from sun-dials, which shewed the hour by the sun's shadow. Others ascribe the invention to Boethius, about the year 510. Mr Derham makes clock-work of a much older standing; and ranks Archimedes's sphere mentioned by Claudian, and that of Ptolemy mentioned by Cicero, among the machines of this kind: not that either their form or use were the same with those of ours, but that they had their motion from some hidden weights or springs, with wheels, or pulleys, or some such clock-work principle. But be this as it will, it is certain the art of making clocks, such as are now in use, was either first invented, or at least retrieved, in Germany, about

Clock
||
Clock.

about 200 years ago. The water-clocks, or clepsydræ, and sun-dials, have both a much better claim to antiquity. The French annals mention one of the former kind sent by Aaron, king of Persia, to Charlemagne, about the year 807, which seemed to bear some resemblance to the modern clocks: it was of brass, and shewed the hours by twelve little balls of the same metal, which fell at the end of each hour, and in falling struck a bell and made it sound. There were also figures of 12 cavaliers, which at the end of each hour came forth at certain apertures or windows in the side of the clock, and shut them again, &c.

The invention of pendulum-clocks is owing to the happy industry of the last age: the honour of it is disputed by Huygens and Galileo. The former, who has written a volume on the subject, declares it was first put in practice in the year 1657, and the description thereof printed in 1658. Becher, *de Nova Temporis Dimensiendi Theoria*, anno 1680, sticksles for Galileo; and relates, though at second-hand, the whole history of the invention; adding, that one Treller, clock-maker to the then father of the grand-duke of Tuscany, made the first pendulum-clock at Florence, by direction of Galileo Galilei; a pattern of which was brought into Holland. The academy de'l Cimento say expressly, that the application of the pendulum to the movement of a clock was first proposed by Galileo, and first put in practice by his son Vincenzo Galilei, in 1649. Be the inventor who he will, it is certain the invention never flourished till it came into Huygens's hands, who insists on it, that if ever Galileo thought of such a thing, he never brought it to any degree of perfection. The first pendulum-clock made in England, was in the year 1622, by Mr Fromant, a Dutchman.

Amongst the modern clocks, those of Strasburg and Lyons are very eminent for the richness of their furniture, and the variety of their motions and figures. In the first, a cock claps his wings, and proclaims the hour; the angel opens a door, and salutes the virgin; and the holy Spirit defends on her, &c. In the second, two horsemen encounter, and beat the hour on each other: a door opens, and there appears on the theatre the virgin, with Jesus Christ in her arms; the magi, with their retinue, marching in order, and presenting their gifts; two trumpeters, founding all the while to proclaim the procession. These, however, are excelled by two lately made by English artists, and intended as a present from the East India company to the emperor of China. The clocks we speak of are in the form of chariots, in which are placed, in a fine attitude, a lady, leaning her right hand upon a part of the chariot, under which is a clock of curious workmanship, little larger than a shilling, that strikes and repeats, and goes eight days. Upon her finger sits a bird finely modelled, and set with diamonds and rubies, with its wings expanded in a flying posture, and actually flutters for a considerable time on touching a diamond button below it; the body of the bird (which contains part of the wheels that in a manner give life to it) is not the bigness of the 16th part of an inch. The lady holds in her left hand a gold tube not much thicker than a large pin, on the top of which is a small round box, to which a circular ornament set with

diamonds not larger than a fixpence is fixed, which goes round near three hours in a constant regular motion. Over the lady's head, supported by a small fluted pillar no bigger than a quill, is a double umbrella, under the largelt of which a bell is fixed at a considerable distance from the clock, and seems to have no connection with it; but from which a communication is secretly conveyed to a hammer, that regularly strikes the hour, and repeats the same at pleasure, by touching a diamond button fixed to the clock below. At the feet of the lady is a gold dog; before which from the point of the chariot are two birds fixed on spiral springs; the wings and feathers of which are set with stones of various colours, and appear as if flying away with the chariot, which, from another secret motion, is contrived to run in a straight, circular, or any other direction; a boy that lays hold of the chariot behind, seems also to push it forward. Above the umbrella are flowers, and ornaments of pearls, rubies, and other precious stones; and it terminates with a flying dragon set in the same manner. The whole is of gold, most curiously executed, and embellished with gold, rubies, and pearls.

Of the Mechanism of Clocks, and how they measure Time. The first figure of Plate LXXX is a profile of a clock: P is a weight that is suspended by a rope that winds about the cylinder or barrel C, which is fixed upon the axis *a a*; the pivots *b b* go into holes made in the plates TS, TS, in which they turn freely. These plates are made of brass or iron, and are connected by means of four pillars ZZ; and the whole together is called the frame.

The weight P, if not restrained, would necessarily turn the barrel C with an uniform accelerated motion, in the same manner as if the weight was falling freely from a height. But the barrel is furnished with a ratchet wheel K K, the right side of whose teeth strikes against the click, which is fixed with a screw to the wheel D D, as represented in fig. 2. so that the action of the weight is communicated to the wheel D D, the teeth of which act upon the teeth of the small wheel *d* which turns upon the pivots *c c*. This communication of the teeth of one wheel with another, is called *engrenage* or *pitching*; and a small wheel, like *d*, is called a *pinion*.

The wheel E E is fixed upon the axis of the pinion *d*; and the motion communicated to the wheel D D by the weight is transmitted to the pinion *d*, consequently to the wheel E E, as likewise to the pinion *e*, and wheel F F, which moves the pinion *f*, upon the axis of which the crown or balance wheel G H is fixed. The pivots of the pinion *f* play in holes of the plates L M which are fixed horizontally to the plates T S. In a word, the motion begun by the weight is transmitted from the wheel G H to the palettes I K, which communicates its motion, by means of the fork U X riveted on the palettes, to the pendulum A B, which is suspended upon the hook A. The pendulum A B describes, round the point A, an arc of a circle alternately going and returning. If then the pendulum be once put in motion by a push of the hand, the weight of the pendulum at B will make it return upon itself, and it will continue to go alternately backward and forward till the resistance of the air upon the pen-

dulum, and the friction at the point of suspension at A, destroys the original impressed force. But as, at every vibration of the pendulum, the teeth of the balance-wheel G H act so upon the palettes I K, (the pivots upon the axis of these palettes play in two holes of the potence s t ;) that after one tooth H has communicated motion to the palette K, that tooth escapes; and then the opposite tooth G acts upon the palette I, and escapes in the same manner; and thus each tooth of the wheel escapes the palettes I, K, after having communicated their motion to the palettes in such a manner that the pendulum, instead of being stop'd, continues to move.

The wheel E E revolves in an hour; the pivot e of this wheel passes through the plate, and is continued to r ; upon the pivot is a wheel N N with a long socket fastened in the centre; upon the extremity of this socket r the minute-hand is fixed. The wheel N N acts upon the wheel O; the pinion of which, p , acts upon the wheel $g g$, fixed upon a socket which turns along with the wheel N. This wheel $g g$ makes its revolution in 12 hours, upon the barrel of which the hour-hand is fixed.

From the above description it is easy to see, 1. That the weight p turns all the wheels, and at the same time continues the motion of the pendulum. 2. That the quickness of the motion of the wheels is determined by that of the pendulum. 3. That the wheels point out the parts of time divided by the uniform motion of the pendulum.

When the cord upon which the weight is suspended is entirely run down from off the barrel, it is wound up again by means of a key, which goes on the square end of the arbor at Q, by turning it in a contrary direction from that in which the weight descends. For this purpose, the inclined side of the teeth of the wheel R (fig. 2.) removes the click C, so that the ratchet-wheel R turns while the wheel D is at rest: but as soon as the cord it wound up, the click falls in between the teeth of the wheel D, and the right side of the teeth again act upon the end of the click, which obliges the wheel D to turn along with the barrel; and the spring A keeps the crank between the teeth of the ratchet-wheel R.

We shall now explain how time is measured by the motion of the pendulum; and how the wheel E, upon the axis of which the minute-hand is fixed, makes but one precise revolution in an hour. The vibrations of a pendulum are performed in a shorter or longer time in proportion to the length of the pendulum itself. A pendulum of 3 feet 8½ French lines in length, makes 3600 vibrations in an hour: i. e. each vibration is performed in a second of time, and for that reason it is called a *second pendulum*. But a pendulum of 9 inches 2½ French lines makes 7200 vibrations in an hour, or two vibrations in a second of time, and is called a *half-second pendulum*. Hence, in constructing a wheel whose revolution must be performed in a given time, the time of the vibrations of the pendulum which regulates its motion must be considered. Supposing, then, that the pendulum AB makes 7200 vibrations in an hour, let us consider how the wheel E shall take up an hour in making one revolution. This entirely depends on the number of teeth in the wheels and

pinions. If the balance-wheel consists of 30 teeth, it will turn once in the time that the pendulum makes 60 vibrations: for at every turn of the wheel, the same tooth acts once on the palette I, and once on the palette K, which occasions two separate vibrations in the pendulum; and the wheel having 30 teeth, it occasions twice 30, or 60 vibrations. Consequently, this wheel must perform 120 revolutions in an hour; because 60 vibrations, which it occasions at every revolution, are contained 120 times in 7200, the number of vibrations performed by the pendulum in an hour. Now, in order to determine the number of teeth for the wheels E F, and their pinions $e f$, it must be remarked, that one revolution of the wheel E must turn the pinion e as many times as the number of teeth in the pinion is contained in the number of teeth in the wheel. Thus, if the wheel E contains 72 teeth, and the pinion e 6, the pinion will make 12 revolutions in the time that the wheel makes 1; for each tooth of the wheel drives forward a tooth of the pinion, and when the 6 teeth of the pinion are moved, a complete revolution is performed; but the wheel E has by that time only advanced 6 teeth, and has still 66 to advance before its revolution be completed, which will occasion 11 more revolutions of the pinion. For the same reason, the wheel F having 60 teeth, and the pinion f 6, the pinion will make 10 revolutions while the wheel performs one. Now, the wheel F being turned by the pinion e , makes 12 revolutions for one of the wheel E; and the pinion f makes 10 revolutions for one of the wheel F; consequently, the pinion f performs 10 times 12 or 120 revolutions in the time the wheel E performs one. But the wheel G, which is turned by the pinion f , occasions 60 vibrations in the pendulum each time it turns round; consequently the wheel G occasions 60 times 120 or 7200 vibrations of the pendulum while the wheel E performs one revolution; but 7200 is the number of vibrations made by the pendulum in an hour, and consequently the wheel E performs but one revolution in an hour; and so of the rest.

From this reasoning, it is easy to discover how a clock may be made to go for any length of time without being wound up: 1. By increasing the number of teeth in the wheels. 2. By diminishing the number of teeth in the pinions. 3. By increasing the length of the cord that suspends the weight: and lastly, by adding to the number of wheels and pinions. But, in proportion as the time is augmented, if the weight continues the same, the force which it communicates to the last wheel G H will be diminished.

It only remains to take notice of the number of teeth in the wheels which turn the hour and minute hands.

The wheel E performs one revolution in an hour; the wheel N N, which is turned by the axis of the wheel E, must likewise make only one revolution in the same time; and the minute-hand is fixed to the barrel of this wheel. The wheel N has 30 teeth, and acts upon the wheel O, which has likewise 30 teeth, and the same diameter; consequently the wheel O takes one hour to a revolution: now the wheel O carries the pinion p , which has 6 teeth, and which acts upon the wheel $g g$ of 72 teeth; consequently the pin-

nion

Fig. 1.

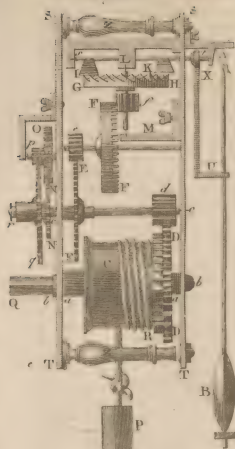


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

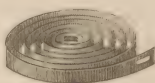


Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

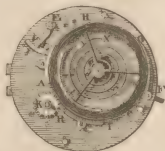


Fig. 12.

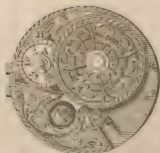


Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.



Clodium
Clofe.

nion *p* makes 12 revolutions while the wheel *qg* makes one, and of courfe the wheel *qg* takes 12 hours to one revolution; and upon the barrel of this wheel the hour-hand is fixed. We fhall conclude with remarking, that all that has been faid here concerning the revolutions of the wheels, &c. is equally applicable to watches as to clocks. See the article *WATCH*, to which the other figures on the plate relate.

CLODIUS (Publius), the Roman fenator; a factitious citizen, whole party became very powerful in Rome, and procured the banifhment of Cicero*. He was killed on the Appian way by one of Milo's fervants, 53 years before Chrift.

CLOGHER, an epifcopal town of Ireland, in the county of Tyrone, and province of Ulfter. It fends two members to parliament. W. Long. 7. 30. N. Lat. 54. 16.

CLOISTER, (Clausfrum,) a habitation furrounded with walls, and inhabited by canons or religious, &c. In a more general fenfe, cloifter is ufed for a monaftery of religious of either fex. In a more reftained fenfe, cloifter is ufed for the principal part of a regular monaftery, confifting of a fquare built around; ordinarily between the church, the chapter-houle, and the refectory; and over which is the dormitory. The cloifters ferved for feveral purpofes in the ancient monafteries. Petrus Blefenfis obferves, that it was here the monks held their lectures: the lecture of morality at the north-fide, next the church; the fchool on the weft, and the chapter on the eaft; fpiritual meditation, &c. being referved for the church. Lanfranc obferves, that the proper ufe of the cloifter was for the monks to meet in, and converse together, at certain hours of the day.

The form of the cloifter was fquare; and it had its name *clausfrum*, from *claudo*, "I fhut or clofe;" as being inclofed on its four fides with buildings. Hence, in architecture, a building is ftill faid to be in form of a cloifter, when there are buildings on each of the four fides of the court.

CLOSE, in heraldry. When any bird is drawn in a coat of arms with its wings clofe down about it, (*i. e.* not difplayed), and in a ftanding pofture; they blazon it by this word *clofe*; but if it be flying, they call it *volant*. See *VOLANT*.

CLOSE, in mufic. See *CADENCE*.

CLOSE-HAULED, in navigation, the general arrangement or trim of a fhip's fails when the endeavours to make a progrefs in the neareft direction poffible towards that point of the compafs from which the wind blows. In this manner of failing, the keel commonly makes an angle of fix points with the line of the wind; but floops and fome other fmall veffels are faid to fail almoft a point nearer. All veffels, however, are fupposed to make nearly a point of lee-way when clofe-hauled, even when they have the advantage of a good failing breeze and fmooth water. The angle of lee-way, however, increafes in proportion to the increafe of the wind and fea. In this difpofition of the fails, they are all extended fide ways on the fhip, fo that the wind, as it croffes the fhip obliquely toward the ftern from forwards, may fill their cavities. But as the current of winds alfo enters the fails in an oblique direction, the effort of it to make the fhip advance

is confiderably diminished: fhe will therefore make the leaft progrefs when failing in this manner. The fhip is faid to be clofe-hauled, becaufe at this time her *tacks*, or lower corners of the principal fails, are drawn clofe down to her fide to windward, the fheets hauled clofe-aft, and all the bow-lines drawn to their greateft extension to keep the fails fteady.

CLOSE-Quarters, certain ftrong barriers of wood, ftretching acrofs a merchant-fhip in feveral places. They are ufed as places of retreat when a fhip is boarded by her adverfary, and are therefore fitted with feveral fmall loop-holes through which to fire the fmall arms, and thereby annoy the enemy and defend themfelves. They are likewife furnifhed with feveral caifons called *powder-cheffts*, which are fixed upon the deck, and filled with powder, old-nails, &c. and may be fired at any time from the clofe-quarters upon the boarders.

We have known an Englifh merchant-fhip of 16 guns, and properly fitted with clofe-quarters, defeat the united efforts of three French privateers who boarded her in the laft war, after having engaged at fome diftance nearly a day and a half, with very few intervals of reft. Two of the cruifers were equipped with twelve guns each, and the other with eight. The French failors were, after boarding, fo much expofed to continued fire of mulquetry and coehorns charged with grenades, that a dreadful fcene of carnage enfued, in which the decks were foon covered with the dead bodies of the enemy, feveral of the boarders, in their hurry to efcape, had left behind.

CLOT-HERRD; a fpecies of *FRINGILLA*.

CLOTH, in commerce, a manufacture made of wool, wove in the loom.

Cloths are of divers qualities, fine or courfe. The goodnefs of cloth, according to fome, confifts in the following particulars. 1. That the wool be of a good quality, and well drefsed. 2. It muft be equally fpun, carefully obferving that the thread of the warp be finer and better twifted than that of the woof. 3. The cloth muft be well wrought, and beaten on the loom, fo as to be every where equally compaét. 4. The wool muft not be finer at one end of the piece than in the reft. 5. The lifts muft be fufficiently ftrong, of the fame length with the ftuff, and muft confift of good wool, hair, or oftich-feathers; or, what is ftill better, of Daniſh dog's hair. 6. The cloth muft be free from knots, and other imperfections. 7. It muft be well fcoured with fuller's earth, well filled with the beft white foap, and afterwards wafhed in clear water. 8. The hair or nap muft be well drawn out with the teazel, without being too much opened. 9. It muft be fhorn clofe without making it thread-bare. 10. It muft be well dried. 11. It muft not be tender-ftretched, to force it to its juft dimenfions. 12. It muft be preffed cold, not hot preffed, the latter being very injurious to woolen cloth.

Manufacturing of white Cloths which are intended for dyeing. The beft wool for the manufacturing of cloths are thofe of England and Spain, efpecially thofe of Lincolnfhire and Segovia. To ufe thofe wools to the beft advantage, they muft be fcoured, by putting them into a liquor fomewhat more than lukewarm,

Clofe
Cloth.

Falconer's
Dict. of the
Marine.

Cloth. composed of three parts fair water, and one of urine. After the wool has continued long enough in the liquor to soak, and dissolve the grease, it is drained and well washed in running water. When it feels dry, and has no smell but the natural one of the sheep, it is said to be duly scoured.

After this, it is hung to dry in the shade; the heat of the sun making it harsh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanse it from dust and the grosser filth; the more it is thus beat and cleaned, the softer it becomes, and the better for spinning. After beating, it must be well picked, to free it from the rest of the filth that had escaped the rods.

It is now in a proper condition to be oiled, and carded on large iron cards placed slopewise. Olive oil is esteemed the best for this purpose: one fifth of which should be used for the wool intended for the woof, and a ninth for that designed for the warp. After the wool has been well oiled, it is given to the spinners, who first card it on the knee with small fine cards, and then spin it on the wheel, observing to make the thread of the warp smaller by one third than that of the woof, and much compacter twisted.

The thread thus spun, is reeled, and made into skeins. That designed for the woof is wound on little tubes, pieces of paper, or rushes, so disposed as that they may be easily put in the eye of the shuttle. That for the warp is wound on a kind of large wooden bobbins, to dispose it for warping. When warped, it is stiffened with size; the best of which is that made of shreds of parchment; and when dry, is given to the weavers, who mount it on the loom.

The warp thus mounted, the weavers, who are two to each loom, one on each side, tread alternately on the treadle, first on the right step, and then on the left, which raises and lowers the threads of the warp equally; between which they throw transversely the shuttle from the one to the other: and every time that the shuttle is thus thrown, and a thread of the woof inserted within the warp, they strike it conjointly with the same frame, wherein is fastened the comb or reed, between whose teeth the threads of the warp are passed, repeating the stroke as often as is necessary.

The weavers having continued their work till the whole warp is filled with the woof, the cloth is finished; it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was wove; and now given to be cleaned of the knots, ends of threads, straws, and other filth, which is done with iron nippers.

In this condition it is carried to the fullery, to be scoured with urine, or a kind of potter's clay, well steeped in water, put along with the cloth in the trough wherein it is filled. The cloth being again cleared from the earth or urine, is returned to the former hands to have the lesser filth, small straws, &c. taken off as before: then it is returned to the fuller to be beat and filled with hot water, wherein a suitable quantity of soap has been dissolved; after fulling, it is taken out to be smoothed, or pulled by the lifts lengthwise, to take out the wrinkles, crevices, &c.

The smoothing is repeated every two hours, till

the fulling be finished, and the cloth brought to its proper breadth: after which it is washed in clear water, to purge it of the soap, and given wet to the carders to raise the hair or nap on the right side with the thistle or weed. After this preparation the cloth-worker takes the cloth, and gives it its first cut or shearing; then the carders return it, and after wetting, give it as many more courses with the teazle, as the quality of the stuff requires, always observing to begin against the grain of the hair, and to end with it; as also to begin with a smoother thistle, proceeding still with one sharper and sharper, as far as the sixth degree.

After these operations, the cloth being dried, is returned to the cloth-worker, who sheers it a second time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the surface of the cloth, from one end of the piece to the other.

The cloth thus wove, scoured, napped, and shorn, is sent to the dyer; when dyed, it is washed in fair water, and the worker takes it again wet as it is, lays the nap with a brush on the table, and hangs it on the tenters, where it is stretched both in length and breadth sufficiently to smooth it, set it square, and bring it to its proper dimensions, without straining it too much; observing to brush it across, the way of the nap, while a little moist, on the tenters.

When quite dry, the cloth is taken off the tenters, and brushed again on the table, to finish the laying of the nap; after which it is folded, and laid cold under a press, to make it perfectly smooth and even, and give it a gloss.

Lastly, the cloth being taking out of the press, and the papers, &c. for glossing it removed, it is in a condition for sale or use. With regard to the manufacture of mixt cloths, or those wherein the wools are first dyed, and then mixt, spun and wove of the colours intended, the process, except what relates to the colour, is mostly the same with that just represented.

Cloth made from Vegetable Filaments. See BARK and FILAMENTS.

Incombustible CLOTH. See ASBESTOS.

CLOUD, a collection of vapours suspended in the atmosphere.

That the clouds are formed from the aqueous vapours which before were so closely united with the atmosphere as to be invisible, is universally allowed: but it is no easy matter to account for the long continuance of some very opaque clouds without dissolving; or to give a reason why the vapours, when they have once begun to condense, do not continue to do so till they at last fall to the ground in the form of rain or snow, &c. Under the article **BAROMETER**, n° 23. we have hinted at the general cause of the formation of clouds, namely, a separation of the latent heat from the water whereof the vapour is composed. The consequence of this separation, as is undeniably proved by Dr Black, must be the condensation of that vapour, in some degree at least: in such case, it will first appear as a smoke, mist, or fog; which, if interposed betwixt the sun and earth, will form a cloud; and, the same causes continuing to act, the cloud will produce

**Cloth
Cloud.**

**Cause of
formation
of clouds
uncertain.**

Cloud.

Cloud.

produce rain or snow. But though the separation of this latent heat in a certain degree is the immediate cause of the formation of clouds, the remote cause, or the changes produced in the atmosphere, whereby such a separation may be induced, are much more difficult to be discovered. In common observation, we see that vapour is most powerfully condensed by cold substances, such as metals, water, &c. But cold alone cannot in all cases cause the condensation of the atmospheric vapours, otherwise the nights behoved to be always foggy or cloudy, owing to the vapours, raised throughout the day by the heat of the sun, being condensed by the superior coldness of the night. Great rains will happen in very warm weather, when the union of the vapours with the atmosphere ought rather to be promoted than dissolved, if cold was the only agent in their condensation. The serenity of the atmosphere, also, in the most severe frosts, abundantly shews that some other cause besides mere heat or cold is concerned in the formation of clouds, and condensation of the atmospheric vapours.

2
Not always
owing to
cold.

3
Electricity
probably
concerned.

The electric fluid is now so generally admitted as an agent in all the great operations of nature, that it is no wonder to find the formation of clouds attributed to it. This hath accordingly been given by S. Beccaria as the cause of the formation of all clouds whatsoever, whether of thunder, rain, hail, or snow. The first, he thinks, are produced by a very great power of electricity, and the others by one more moderate. But though it is certain that all clouds, or even fogs and rain, are electrified in some degree, it still remains a question, whether the clouds are formed in consequence of the vapour whereof they are composed being first electrified, or whether they become electrified in consequence of its being first separated from the atmosphere, and in some measure condensed. This hath not yet, as far as we know, been ascertained by the experiments of Beccaria, or any other person, and indeed, notwithstanding the multitude of electrical discoveries that have lately been made, there seems to be little or no foundation for ascertaining it. Electricity is known to be in many cases a promoter of evaporation; but no experiments have yet been brought to prove, that electrified air parts with its moisture more readily than such as is not electrified; so that, till the properties of electrified air are farther investigated, it is impossible to lay down any rational theory of the formation of clouds upon this principle.

4
Clouds of
ten prodigi-
ously elec-
trified.

5
Terrible
destruction
by an elec-
trified cloud
in Java.

But whether the clouds are produced, *i. e.* the invisible vapours floating in the atmosphere condensed so as to become visible, by means of electricity, or not, it is certain that they do contain the electric fluid in prodigious and inconceivable quantities, and many very terrible and destructive phenomena have been occasioned by clouds very highly electrified. The most extraordinary instance of this kind, perhaps, on record, happened in the island of Java in the East Indies in August 1772. On the 11th of that month, at midnight, a bright cloud was observed covering a mountain in the district called *Cheribon*, and at the same time several reports were heard like those of a gun. The people who dwelt on the upper parts of the mountain not being able to fly fast enough, a great

part of the cloud, almost three leagues in circumference, detached itself under them, and was seen at a distance rising and falling like the waves of the sea, and emitting globes of fire so luminous, that the night became as clear as day. The effects of it were astonishing: every thing was destroyed for seven leagues round; the houses were demolished; plantations were buried in the earth; and 2140 people lost their lives, besides 1500 head of cattle, and a vast number of horses, goats, &c.

Another instance of a very destructive cloud, the electric qualities of which will at present scarcely be doubted, is related by Mr Brydson, in his tour through Malta. It appeared on the 29th of October 1757. About three quarters of an hour after midnight, there was seen to the south-west of the city of Melita, a great black cloud, which, as it approached, changed its colour, till at last it became like a flame of fire mixed with black smoke. A dreadful noise was heard on its approach, which alarmed the whole city. It passed over the port, and came first on an English ship, which in an instant was torn in pieces, and nothing left but the hull; part of the masts, sails, and cordage, were carried to a considerable distance along with the cloud. The small boats and fellogoes that fell in its way were all broken to pieces and sunk. The noise increased and became more frightful. A sentinel terrified at its approach ran into his box; but both he and it were lifted up and carried into the sea, where he perished. It then traversed a considerable part of the city, and laid in ruins almost every thing that stood in its way. Several houses were laid level with the ground, and it did not leave one steeple in its passage. The bells of some of them, together with the spires, were carried to a considerable distance; the roofs of the churches demolished and beat down, &c. It went off at the north-east point of the city, and demolishing the light-house, is said to have mounted up into the air with a frightful noise; and passed over the sea to Sicily, where it tore up some trees, and did other damage; but nothing considerable, as its fury had been mostly spent at Malta. The number of killed and wounded amounted to near 200; and the loss of shipping, &c. was very considerable. See HURRICANE, and WHIRLWIND.

6
By another
in the island
of Malta.

The effects of thunder-storms, and the vast quantity of electricity collected in the clouds which produce these storms, are so well known, that it is superfluous to mention them. It appears, however, that even these clouds are not so highly electrified as to produce their fatal effects on those who are immersed in them. It is only the discharge of part of their electricity upon such bodies as are either not electrified at all, or not so highly electrified as the cloud, that does all the mischief. We have, however, only the following instance on record, of any person's being immersed in the body of a thunder-cloud. Professor Saussure, and young Mr Jakabert, when travelling over one of the high Alps, were caught among clouds of this kind; and to their astonishment found their bodies so full of electrical fire, that spontaneous flashes darted from their fingers with a crackling noise, and the same kind of sensation as when strongly electrified by art.

7
Instance of
two people
involved in
a thunder-
cloud.

The height of clouds in general is not great; the summits of very high mountains being commonly quite free

8

Height of
the clouds.
free

Cloud
Cloyne.

* See Thun-
der.

9
Their vari-
ous colours
accounted
for.

free from them, as Mr Brydon experienced in his journey up mount Aetna : but those which are most highly electrified descend lowly, their height being often not above seven or eight hundred yards above the ground ; nay, sometimes thunder-clouds appear actually to touch the ground with one of their edges * ; but the generality of clouds are suspended at the height of a mile, or little more, above the earth. Some, however, have imagined them to rise to a most incredible and extravagant height. Maignan of Tholouze, in his treatise of Perspective, p. 93, gives an account of an exceeding bright little cloud that appeared at midnight in the month of August, which spread itself almost as far as the zenith. He says that the same thing was also observed at Rome ; and from thence concludes, that the cloud was a collection of vapours raised beyond the projection of the earth's shadow, and of consequence illuminated by the beams of the sun. This, however, can by no means be credited ; and it is much more probable that this cloud owed its splendor to electricity, than to the reflection of the solar beams.

In the evenings after sun-set, and mornings before sun-rise, we often observe the clouds tinged with beautiful colours. They are mostly red ; sometimes orange, yellow, or purple ; more rarely bluish ; and seldom or ever green. The reason of this variety of colours, according to Sir Isaac Newton, is the different size of the globules into which the vapours are condensed. This is controverted by Mr Melville, who thinks that the clouds reflect the sun's light precisely as it is transmitted to them through the atmosphere. This reflects the most refrangible rays in the greatest quantity ; and therefore ought to transmit the least refrangible ones, red, orange, and yellow, to the clouds, which accordingly appear most usually of those colours. In this opinion he was greatly confirmed by observing, when he was in Switzerland, that the snowy summits of the Alps turned more and more reddish after sun-set, in the same manner as the clouds : and he imagines that the semi-transparency of the clouds, and the obliquity of their situation, tend to make the colours in them much more rich and copious than those on the tops of snowy mountains.

CLOVES, in botany. See CARYOPHYLLUS.

CLOVE-TREE, in botany. See CARYOPHYLLUS.

CLOVE, a term used in weights of wool. Seven pounds make a clove. In Elix, eight pounds of cheese and butter go to the clove.

CLOVE *July-flower*. See DIANTHUS.

CLOVER-GRASS, in botany. See TRIFOLIUM ; and AGRICULTURE, n^o 133—135.

CLOVIS I. was the real founder of the French monarchy. For he was the first conqueror of the several provinces of Gaul possessed before his time by the Romans, Germans and Goths : these he united to the then scanty dominions of France, removed the seat of government from Scissions to Paris, and made this the capital of his new kingdom. He died in 511, in the 46th year of his age, and 3rd of his reign. See (*Hist. of*) FRANCE.

CLOYNE, a city and bishop's see of Ireland, in the county of Cork, and province of Munster : W. Long. 8. o. N. Lat. 51. 40.

CLUE of a SAIL, the lower corner ; and hence

CLUE-Garnets, are a sort of tackles fastened to the clues, or lower corners of the main-fail, or fore-fail, to truss them up to the yard as occasion requires, which is usually termed *clueing up* the sails.

CLUE-Lines are for the same purpose as clue-garnets ; only that the latter are confined to the courtes, whereas the former are common to all the square-sails. See these ropes as represented in the article SHIP.

CLUNY, or CLUGNY, a celebrated abbey of Benedictine monks, in a city of that name ; being the head or chief of a congregation denominated from thence.

It is situated in the Maçonnois, a little province of France, on the river Grône ; and was founded by William duke of Berry and Aquitain ; or, as others say, by the abbot Bernon, supported by that duke, in the year 910.

This abbey was anciently so very spacious and magnificent, that in 1245, after the holding of the first council of Lyons, Pope Innocent IV. went to Cluny, accompanied with the 2 patriarchs of Antioch and Constantinople, 12 cardinals, 3 archbishops, 15 bishops, and a great number of abbots ; who were all entertained, without one of the monks being put out of their place : tho' S. Louis, Q. Blanche his mother, the duke of Artois his brother, and his sister, the emperor of Constantinople, the sons of the kings of Arragon and Castile, the duke of Burgundy, 6 counts, and a great number of lords, with all their retinues, were there at the same time.

Cluny, at its first erection, was put under the immediate protection of the apostolic see ; with express prohibition to all secular and ecclesiastical powers, to disturb the monks in the possession of their effects, or the election of their abbot. By this they pretended to be exempted from the jurisdiction of bishops ; which at length gave the hint to other abbeyes to insist on the same.

Cluny is the head of a very numerous and extensive congregation : in effect, it was the first congregation of divers monasteries united under one chief, so as only to constitute one body, or, as they call it, one order, that ever arose.

CLUPEA, or herring, in ichthyology, a genus belonging to the order of abdominales. The upper jaw is furnished with a serrated mytstache ; the branchiostegic membrane has eight rays ; a scaly serrated line runs along the belly from the head to the tail ; and the belly-fins have frequently nine rays. There are 11 species, viz.

1. The *harengus*, or common herring, has no spots, and the under jaw is longer than the upper one. A herring dies immediately after it is taken out of the water ; whence the proverb arises, *As dead as a herring*. The meat is every where in great esteem, being fat, soft, and delicate ; especially if it is dressed as soon as caught, for then it is incomparably better than on the next day.

The herring was unknown to the ancients. Notwithstanding the words *ῥαδιν* and *μακρί*, are, by translators rendered *hake*, the characters given to those fish are common to such numbers of different species as render it impossible to say which they intended.

Herrings are found from the highest northern latitudes,

Clue
Clupea.

Clupea.

1
Herrings,
where
found.2
Immense
school of
them.2
Wonderful
instinct of
these crea-
tures.

Clupea.

4
Young ones
probably
retire with
their pa-
rents.5
History of
the herring
fishery.

tudes, yet known as low as the northern coasts of France; and except one instance, brought by Dod, of a few being once taken in the bay of Tangier, none are ever found more southerly. They are met with in vast shoals on the coast of America, as low as Carolina. In Cheapeake-bay is an annual inundation of those fish, which cover the shore in such quantities as to become a nuisance. We find them again in the seas of Kamtschatka, and probably they reach Japan; for Kempter mentions, in his account of the fish of that country, some that are congenerous. The great winter rendezvous of the herring is within the Arctic Circle; there they continue for many months in order to recruit themselves after the fatigue of spawning; the seas within that space swarming with insect-food in a far greater degree than those of our warmer latitudes. This mighty army begins to put itself in motion in the spring: we distinguish this vast body by that name; for the word *herring* comes from the German *beer*, "an army," to express their numbers. They begin to appear off the Shetland isles in April and May; there are only the forerunners of the grand shoal which comes in June: and their appearance is marked by certain signs, by the numbers of birds, such as gannets and others, which follow to prey on them; but when the main body approaches, its breadth and depth is such as to alter the appearance of the very ocean. It is divided into distinct columns of five or six miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling: sometimes they sink for the space of ten or fifteen minutes, and then rise again to the surface; and in fine weather reflect a variety of splendid colours like a field of the most precious gems; in which, or rather in a much more valuable, light should this stupendous gift of Providence be considered by the inhabitants of the British isles.

The first check this army meets in its march southward is from the Shetland isles, which divide it into two parts; one wing takes to the east, the other to the western shores of Great Britain, and fill every bay and creek with their numbers; others pass on towards Yarmouth, the great and ancient mart of herrings: they then pass through the British Channel, and after that, in a manner disappear. Those which take towards the west, after offering themselves to the Hebrides, where the great stationary fishery is, proceed to the north of Ireland, where they meet with a second interruption, and are obliged to make a second division: the one takes to the western side, and is scarce perceived, being soon lost in the immensity of the Atlantic; but the other, that passes into the Irish sea, rejoices and feeds the inhabitants of most of the coasts that border on it. These brigades, as we may call them, which are thus separated from the greater columns, are often capricious in their motions, and do not shew an invariable attachment to their haunts.

Were we inclined to consider this partial migration in a moral light, we might reflect with veneration and awe on the mighty power which originally impressed on this most useful body of his creatures; the instinct that directs and points out the course, that blesses and enriches these islands, which causes them, at certain and invariable times, to quit

the vast polar deeps, and offer themselves to our expecting fleets. That benevolent Being has never been known, from the earliest account of time, once to withdraw this blessing from the whole; though he often thinks proper to deny it to particulars, yet this partial failure (for which we see no natural reason) should fill us with the most exalted and grateful sense of his Providence for impressing such an invariable and general instinct on these fish towards a southward migration when the whole is to be benefited, and to withdraw it when only a minute part is to suffer.

This instinct was given them, that they might remove for the sake of depositing their spawn in warmer seas, that would mature and vivify it more assuredly than those of the frozen zone. It is not from defect of food that they set themselves in motion; for they come to us full of fat, and on their return are almost universally observed to be lean and miserable. What their food is near the Pole we are not yet informed; but in our seas they feed much on the *oviscus marinus*, a crustaceous insect, and sometimes on their own fry.

They are full of roe in the end of June, and continue in perfection till the beginning of winter, when they deposit their spawn. The young herrings begin to approach the shores in July and August, and are then from half an inch to two inches long: those in Yorkshire are called *herring file*. Though we have no particular authority for it, yet as very few young herrings are found in our seas during winter, it seems most certain that they must return to their parental haunts beneath the ice, to repair the vast destruction of their race during summer by me, fowl, and fish. Some of the old herrings continue on our coast the whole year: the Scarborough fishermen never put down their nets but they catch a few; but the numbers that remain are not worth comparison with those that return.

The herring-fishery is of great antiquity. The industrious Dutch first engaged in it about the year 1164; and they were in possession of it for several centuries: but at length its value became so justly to be known, that it gave rise to most obstinate and well-disputed wars between the English and them; but still their diligence and skill gives them a great advantage in that branch of trade. Our great stations are off the Shetland and Western isles, and off the coast of Norfolk, in which the Dutch also share. Yarmouth has been long famous for its herring-fair; that town is obliged by its charter to send to the sheriffs of Norwich, 100 herrings, to be made into 24 pies, by them to be delivered to the lord of the manor of East Carleton, who is to convey them to the king. The facetious Dr Fuller takes notice of the great repute the county of Norfolk was in for this fish, and, with his usual archness, styles a red-herring a *Norfolk capon*. In 1195, Dunwich in Suffolk accounted to the king for their yearly farm-rent L. 120, 1 merk, and 24,000 herrings; 12,000 for the monks of Ely, and 12,000 for those of Eye.

The Dutch are most extravagantly fond of this fish when it is pickled. A premium is given to the first bus that arrives in Holland with a lading of this their ambrosia, and a vast price given for each keg. There is as much joy among the inhabitants on its arrival, as

Clupea.

6
Pickling of
herrings,
when in-
vented.

the Egyptians shew on the first overflowing of the Nile. Flanders had the honour of inventing the art of pickling herrings. One William Beaulken of Beverlet, near Sluys, hit on this useful expedient: from him was derived the name *pickle*, which we borrow from the Dutch and German. Beaulken died in 1397. The emperor Charles V. held his memory in such veneration for the service he did to mankind, as to do his tomb the honour of a visit. It is very singular that most nations give the name of their favourite dish to the facetious attendant on every mountebank. Thus the Dutch call him *pickle herring*; the Italians, *macaroni*; the French, *jeau pottage*; the Germans, *hans wurst*, that is, *jack sausage*; and the English dignify him with the name of *jack pudding*.

7
Sprattus,
where
found.

2. The *sprattus* has 13 rays in the back fin. It is a native of the European seas, and has a great resemblance to the herring, only it is of a less size. They come into the river Thames below bridge in the beginning of November, and leave it in March; and are, during that season, a great relief to the poor of the capital. At Gravesend and at Yarmouth, they are cured like red-herrings: they are sometimes pickled, and are little inferior in flavour to the anchovy, but the bones will not dissolve like those of the latter.

7
Alofa, or
shad, where
found.

3. The *alofa*, or *shad*, has a forked snout, and black spots on the sides. According to Belonius and Hafselquist, this is a fish of passage in the Nile. The last fish, it is found in the Mediterranean near Smyrna, and on the coast of Egypt near Rosetto; and that in the months of December and January it ascends the Nile as high as Cairo, where the people stuff it with pot marjoram; and when dressed in that manner, it will very nearly intoxicate the eater. In Great Britain the Severn affords this fish in higher perfection than any other river. It makes its first appearance there in May, but in very warm seasons in April; for its arrival sooner or later depends much on the temper of the air. It continues in the river about two months, and then is succeeded by a variety which we shall have occasion to mention hereafter.

8
The finest
inhabit the
Severn.

The Severn shad is esteemed a very delicate fish about the time of its first appearance, especially in that part of the river that flows by Gloucester, where they are taken in nets, and usually sell dearer than salmon: some are sent to London, where the fish-mongers distinguish them from those of the Thames, by the French name *alofe*. Whether they spawn in this river and the Wye is not determined, for their fry has not yet been ascertained. The old fish come from the sea into the river in full roe. In the months of July and August, multitudes of bleak frequent the river near Gloucester; some of them are as big as a small herring, and these the fishermen erroneously suppose to be the fry of the shad. Numbers of these are taken near Gloucester, in those months only, but none of the emaciated shad are ever caught in their return.

The Thames shad does not frequent that river till the latter end of May or beginning of June, and is esteemed a very coarse and insipid sort of fish. The Severn shad is sometimes caught in the Thames, though rarely, and called *allis* (no doubt *alofe*, the French name) by the fishermen in that river. About the same time, and rather earlier, the variety called, near

9
Twaite de-
scribed.

Gloucester, the *twaite*, makes its appearance; and is taken in great numbers in the Severn, and is held in as great dispute as the shad of the Thames. The differences between each variety are as follows: the true shad weighs sometimes eight pounds; but their general size is from four to five. The *twaite*, on the contrary, weighs from half a pound to two pounds, which it never exceeds. The *twaite* differs from a shad only in having one or more round black spots on the sides: if only one, it is always near the gill; but commonly there are three or four, placed one under the other.

Clupea.

10
Anchovy
described.

4. The *encrascolus*, or *anchovy*, has its upper jaw longer than the under one, and is about three inches long. They are taken in vast quantities in the Mediterranean, and are brought over here pickled. The great fishery is at Georgia, a smallisle west of Leghorn.

The other species are, 5. The *atherinoides* has a shining line on each side, and small belly-fins. It is a native of Surinam. 6. The *thrilla* has 28 rays in the fin at the anus. It is found in the Indian ocean. 7. The *fima* has yellow fins, those of the belly being very small. The mouth is flat; the upper jaw is very short; the body is of a shining silver colour; and the fins are yellow. It is a native of Asia. 8. The *sternia* has no belly-fins, and the body is broad. It is a native of Surinam. 9. The *mystus* is shaped like a sword, and the fins at the anus are united. It is found in the Indian ocean. 10. The *tropica* has a wedge-like tail, and a white, broad, compressed body; and the tail is wedge-shaped. It is found at Ascension island. 11. The *sinensis* is very like the common herring, but broader. It has no teeth, and is a native of China.

CLUSIA, the BALSAM-TREE; a genus of the monœcia order, belonging to the polygamia class of plants. There are four species, all natives of America. The most remarkable is the *flava*. This is pretty common in the British American islands, where the trees grow to the height of 20 feet, and shoot out many branches on every side, furnished with thick, round, succulent leaves placed opposite. The flowers are produced at the ends of the branches, each having a thick succulent cover. After the flowers are past, they are succeeded by oval fruit. From every part of these trees there exudes a kind of turpentine, which is called in the West Indies *hog-gum*; because they say, that when any of the wild hogs are wounded, they repair to these trees, and rub their wounded parts against the stem till they have anointed themselves with this turpentine, which heals their wounds. These plants are very tender, and in this country must be kept constantly in a stove; and sparingly watered, especially in winter; for they naturally grow in those parts of the islands where it seldom rains, and consequently cannot bear much moisture. They may be propagated from cuttings, which must be laid to dry for a fortnight or three weeks, that the wounded parts may be healed over, otherwise they will rot. The best time for planting these cuttings is in July, that they may be well rooted before the cold weather comes on in autumn.

CLUTIA, a genus of the gynandria order, belonging to the dioecia class of plants. There are three species,

Clavier
Clyfter.

species, all of them natives of warm climates. They are evergreen shrubby plants, rising six or eight feet high, garnished with simple leaves, and greenish-white quinquepetalous flowers. They are propagated by cuttings in spring or summer, planting them in pots of light earth, plunged in a hot-bed. The plants must always be kept in a stove.

CLUVIER (Philip), in Latin *Cluverius*, a celebrated geographer, born at Dantzic in 1580. He travelled into Poland, Germany, and the Netherlands, in order to study law; but, being at Leyden, Joseph Scaliger persuaded him to give way to his genius for geography. Clavier followed his advice, and for this purpose visited the greatest part of the European states. He was well versed in many languages; and wherever he went, obtained illustrious friends and protectors. At his return to Leyden, he taught there with great applause; and died in 1623, aged 43. He wrote, 1. *De tribus Rhein alevi*. 2. *Germania antiqua*. 3. *Sicilia antiqua*. 4. *Italia antiqua*. 5. *Introductio in universam Geographiam*. All justly esteemed.

CLYDE, a river in Scotland, which, arising in Annandale, runs north-west by Lanerk, Hamilton, and Glasgow, and falls into the river Clyde, over against the isle of Bute. Anciently this river was renowned for producing gold dust and lapis lazuli, as it still is for the rich lead mines belonging to the Earl of Hop-ton. These are said to have been discovered by Sir Bevis Bulmer, in the beginning of the last century, while he was endeavouring to find a gold mine.

CLYMENE, in fabulous history, the daughter of Oceanus; who, being beloved by Apollo, he had by her Phæton, Lampatia, Egle, and Phebe. See PHÆTON.

CLYPEOLA, TREACLE-MUSTARD; a genus of the filiculosa order, belonging to the tetradynamia class of plants. There are two species, both natives of France, Italy, and the warm parts of Europe, but hardly enough to bear the winters in this country. One of them is an annual, and the other a perennial plant; both are low and herbaceous, bearing spikes of white flowers. They are propagated by seeds, which should be sown in autumn where they are to remain.

CLYSSUS, an extract prepared, not from one, but several bodies mixt together: and, among the moderns, the term is applied to several extracts prepared from the same body, and then mixed together. See CHEMISTRY, n° 221.

CLYSTER, is a liquid remedy, to be injected chiefly at the anus into the larger intestines. It is usually administered by the bladder of a hog, sheep, or ox, perforated at each end, and having at one of the apertures an ivory pipe fastened with pack-thread. But the French, and sometimes the Dutch, use a pewter syringe, by which the liquor may be drawn in with more ease and expedition than in the bladder, and likewise more forcibly expelled into the large intestines. This remedy should never be administered either too hot or too cold, but tepid; for either of the former will be injurious to the bowels.

Clysters are sometimes used to nourish and support a patient who can swallow little or no aliment, by reason of some impediment in the organs of deglutition;

in which case they may be made of broth, milk, ale, and decoctions of barley and oats with wine. The English introduced a new kind of clyster, made of the smoke of tobacco, which has been used by several other nations, and appears to be of considerable efficacy when other clysters prove ineffectual, and particularly in the iliac passion, in the *hernia incarcerata*, and for the recovery of drowned persons.

CLYTEMNESTRA, in fabulous history, the daughter of Jupiter and Leda. She married Agamemnon; but while that prince was at the siege of Troy, she had an amorous intrigue with Ægisthus, whom she engaged to murder Agamemnon at his return to his dominions. Her son Orestes, however, revenged the death of his father by killing Ægisthus, with his mother Clytemnestra; but was afterwards haunted by the Furies as long as he lived.

CNEORUM, WIDOW-WAIL; a genus of the monogynia order, belonging to the triandria class of plants. There is but one species, a little evergreen, and very ornamental shrub, adorned with simple leaves, and tripetalous flowers of a pale yellow colour. It is propagated from seeds, and requires no other care than to be kept free from weeds.

CNICUS, BLESSED-THISTLE; a genus of the polygama æqualis order, belonging to the syngenesia class of plants. There are seven species, of which the only remarkable one is that used in medicine under the name of *cardus benedictus*. This is an annual plant cultivated in gardens: it flowers in June and July, and perfects its seeds in autumn. For medical purposes the plant should be gathered when in flower, dried in the shade, and kept in a very dry airy place, to prevent its rotting or growing mouldy, which it is very apt to do. The leaves have a penetrating bitter taste, not very strong or durable, accompanied with an ungrateful flavour, which they are in a great measure freed from by keeping. Water extracts in a little time, even without heat, the lighter and more grateful parts of this plant; if the digestion is continued for some hours, the disagreeable parts are taken up; a strong decoction is very nauseous and offensive to the stomach. Rectified spirit gains a very pleasant bitter taste, which remains uninjured in the extract. The virtues of this plant are little known in the present practice. The nauseous decoction is sometimes used to provoke vomiting; and a strong infusion to promote the operation of other emetics. But this elegant bitter, when freed from the offensive parts of the herb, may be advantageously applied to other purposes. Dr Lewis informs us, that he has experienced excellent effects from a light infusion of *cardus* in loss of appetite, where the stomach was injured by irregularities. A stronger infusion made in cold or warm water, if drunk freely, and the patient kept warm, occasions a plentiful sweat, and promotes all the secretions in general. The feeds of the plant are also considerably bitter, and have sometimes been used with the same intention as the leaves.

COACH, a vehicle for commodious travelling, suspended on leathers, and moved on wheels. In England, and throughout Europe, the coaches are drawn by horses, except in Spain, where they use mules. In a part of the east, especially the dominions of the Great

Clytemne-
stra
Coach.

Coach.

Coach
|
Coal.

Mogul, their coaches are drawn by oxen. In Denmark they sometimes yoke rein-deer in their coaches; though rather for curiosity than use. The coachman is ordinarily placed on a seat raised before the body of the coach. But the Spanish policy has displaced him in that country by a royal ordonnance; on occasion of the duke d'Olivares, who found that a very important secret, whereon he had conferred in his coach, had been overheard and revealed by his coachman: since that time the place of the Spanish coachman is the same with that of the French stage-coachman, and our postillion, *viz.* on the first horse on the left.

The invention of coaches is owing to the French: yet are not coaches of any great antiquity, even in France; scarce reaching beyond the reign of their Francis I. Their use, at their first rise, was only for the country: and authors observe, as a thing very singular, that there were at first no more than two coaches in Paris; the one that of the queen, and the other that of Diana natural daughter of Henry II. The first courtier who had one was Jean de Laval de Bois Dauphin; whose enormous bulk disabled him from travelling on horseback. One may hence judge how much variety, luxury, and idleness, have grown upon our hands in later days; there being now computed in that same city no less than 15,000 coaches.

Coaches have had the fate of all other inventions, to be brought by degrees to their perfection; at present they seem to want nothing, either with regard to ease or magnificence. Louis XIV. of France made several sumptuary laws for restraining the excessive richness of coaches, prohibiting the use of gold, silver, &c. therein; but they have had the fate to be neglected.

Coaches may be divided into two kinds; those that have iron bows, or necks, and those that have not: both the one and the other have two principal parts, the body and the train or carriage. The body is that part where the passengers are disposed; and the carriage that which sustains the body, and to which the wheels are fastened, that give motion to the whole machine. Coaches, with regard to their structure, are divided into *coaches* properly so called, *chariots*, *calashes*, &c.

Hackney-COACHES, those exposed to hire, in the streets of London, and some other great cities, at rates fixed by authority.

Eight hundred hackney-coaches, and 200 chairs, are allowed in London and Westminster; which are to be licensed by commissioners, and to pay a duty to the crown. They are all numbered, having their numbers engraven on tin plates fixed on the coach doors. Their fares or rates are fixed by act of parliament; 10s. for a whole day of 12 hours, for a single hour 1s. 6d.; for every hour after the first 1s. At these rates they are obliged to carry passengers any where within 10 miles of London.

Stage-COACHES, are those appointed for the conveyance of travellers from one city or town to another. The masters of stage-coaches are not liable to an action for things lost by their coachmen, who have money given them to carry the goods, unless where such master takes a price for the same.

COACH, or *Couch*, is also a sort of chamber or apartment in a large ship of war near the stern. The floor of it is formed by the almost part of the quarter-deck, and the roof of it by the poop: it is generally the habitation of the captain.

COADUNATE, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnæus, in which he has these genera, *viz.* annona, liriodendrum, magnolia, uvaria, michelia, thea. See BOTANY, p. 1216. Vol. II.

COAGULATION, in chemistry, is performed by six different agents; and by each of these in several different manners. 1. It is performed with water, by congealing, crystallizing, and precipitating, as in the mercurius vitæ, and some other preparations. 2. With oil, which, by the force of fire, unites with sulphur, salts, and metals. 3. With alcohol, upon the spirit of sal ammoniac, the white of eggs, the serum of the blood, &c. 4. With acid and alkali growing solid together, as in the tartarum vitriolatum. 5. With fixed alkali, as in milk. And, 6. With acid salts; as in milk, serum, and the whites of eggs.

COAGULUM, is the same with what in English we call *runnet*, or rather the curd formed thereby.

COAKS. For the exciting of intense heats, as for the smelting of iron ore, and for operations where the acid and oily particles would be detrimental, as the drying of malt, fossil-coals are previously charred, or reduced to *coaks*; that is, they are made to undergo an operation similar to that by which charcoal is made. By this operation coals are deprived of their phlegm, their acid liquor, and part of their fluid oil. Coaks, therefore, consist of the two most fixed constituent parts, the heavy oil and the earth, together with the acid concrete salt, which, though volatile, is dissolved by the oil and the earth.

COAL, among chemists, signifies any substance containing oil, which has been exposed to the fire in close vessels, so that all its volatile principles are expelled, and that it can sustain a red heat without further decomposition. Coal is commonly solid, black, very dry, and considerably hard. The specific character of perfect coal is its capacity of burning with access of air, while it becomes red-hot and sparkles, sometimes with a sensible flame which gives little light, with no smoke or foot capable of blackening white bodies.

Coal is capable of communicating its inflammable principle, either to the vitriolic acid with which it forms sulphur; or to the nitrous acid contained in nitre, which it inflames; or to metallic earths, which it reduces into metals. But the phlogiston cannot pass from coal to form these new combinations without the assistance of red-heat. Coal seems to be an unalterable compound in every instance but those mentioned, of burning in the open air, and of communicating its phlogiston to other bodies: for it may be exposed in close vessels to the most violent and long continued fire without suffering the least decomposition. No disposition to fuse, nor any diminution of weight, can be perceived. It is a substance exceedingly fixed, and perhaps the most refractory in nature. It resists the action of the most powerful menstrua, liver of sulphur alone excepted. Coal is evidently a result of the decomposition of the compound bodies from which it is obtained.

Coal.

obtained. It consists of the greatest part of the earthy principle of these compound bodies, with which a part of the saline principles, and some of the phlogiston of the decomposed oil, are fixed and combined very intimately. Coal can never be formed but by the phlogiston of a body which has been in an oily state: hence it cannot be formed by sulphur, phosphorus, metals, nor by any other substance the phlogiston of which is not in an oily state. Also every oily matter treated with fire in close vessels, furnishes true coal; so that whenever a charry residuum is left, we may be certain that the substance employed in the operation contained oil. Lastly, the inflammable principle of coal, although it proceeds from oil, certainly is not oil; but pure phlogiston; since coal added to vitriolic acid can form sulphur, to phosphoric acid can form phosphorus, &c. and since oil can produce none of these effects till it has been decomposed and reduced to the state of coal. Besides, the phenomena accompanying the burning of coal are different from those which happen when oily substances are burnt. The flame of charcoal is not so bright as that of oil, and produces no flame or foot.

All the phlogiston of coal is not burnt in the open air, particularly when the combustion is slow. One part of it exhales without decomposition, and forms a vapour, or an invisible and insensible gas. This vapour, (which is, or at least contains a great deal of, fixed air) is found to be very pernicious, and to affect the animal system in such a manner as to occasion death in a very short time. For this reason it is dangerous to remain in a close place, where charcoal or any other sort of coal is burnt. Persons struck by this vapour are stunned, faint, suffer a violent headache, and fall down senseless and motionless. The best method of recovering them is by exposure to the open air, and by making them swallow vinegar, and breathe its steam.

Amongst coals, some differences are observable, which proceed from the difference of the bodies from which they are made: some coals, particularly, are more combustible than others. This combustibility seems to depend on the greater or less quantity of saline principle they contain; that is, the more of the saline principle it contains, the more easily it decomposes and burns. For example, coals made of plants and wood containing much saline matter capable of fixing it, the ashes of which contain much alkaline salt, burn vigorously and produce much heat; whereas the coals of animal matters, the saline principles of which are volatile, and cannot be fixed but in small quantity, and the ashes of which contain little or no salt, are scarcely at all combustible. For they not only do not kindle so easily as charcoal does, nor ever burn alone, but they cannot be reduced to ashes, without very great trouble, even when the most effectual methods are used to facilitate the combustion. The coal of bullocks blood has been kept for six hours very red in a shallow crucible, surrounded with burning charcoal, and constantly stirred all the time, that it might be totally exposed to the air; yet could it not be reduced to white, or even grey, ashes. It still remained very black, and full of phlogiston. The coals of pure oils are of concrete oily substances and foot, which is a kind of coal raised during inflammation, are as difficultly reduced to ashes

as animal coals. These coals contain very little saline matter; and their ashes yield no alkali. The coals which are so difficultly burnt, are also less capable of inflaming with nitre than others more combustible; and some of them even in a great measure resist the action of nitre.

Cannel-Coal. See AMPELITES.

Fossil Coal, or Pit-coal. See LITHANTHRAX and COALERY.

Coal-Fish. See GADUS.

Coal-Mine. See COALERY.—Maliciously setting fire to coal-mines is felony, by stat. 10 Geo. II. c. 32. § 6.

Small-Coal, a sort of charcoal prepared from the spray and brushwood stripped off from the branches of coppice wood, sometimes bound in bairns for that purpose, and sometimes charred without binding, in which case it is called "coming it together."

COALERY, COLLIERY, or COLLIERY, a coal-History of coals, work, or place where coals are dug. See LITHANTHRAX.

It is generally agreed, that our cannel-coal* is the lapis ampetites of the Romans; though it seems to have been used by them only for making toys, bracelets, &c. But of that common fuel which we denominate *coals*, the native Romans were entirely ignorant. It is certain that they are not, as some have imagined, the lapis obsidianus of Pliny†, about which there have been great disputes: nor the GAGATES, or JET, which others, again, have taken for the *lapis obsidianus*; though the lightness and texture show plainly that it is not either stone or coal. In fact, there are no beds of it in the compass of Italy. The great line of that fuel seems to sweep away round the globe, from north-east to south-west; not ranging at a distance even from the south-easterly parts of our island, as is generally imagined, but actually visiting Brabant and France, and yet avoiding Italy.

But the primeval Britons appear to have used it. And in the precincts of Manchester particularly, which are furnished with an inexhaustible abundance of it, they could not have remained unapprised of the agreeable combustible around them. The currents there frequently bring down fragments of coal from the mountains; and in the long and winding course of them through the parish, the Britons would soon mark the shining stones in the channels; and by the aid of accident, or the force of reflection, find out the utility of them. But we can advance still nearer to a certainty. Several pieces of coal were discovered some years ago in the sand under the Roman way to Ribchester, when both were dug up at the construction of a house in Quay-street. The number of pieces, several of them as large as eggs, was not less than 40; and a quantity of slack was dug up with them. These circumstances show the coals to have been lodged upon the spot, before the road of the Romans covered it. That ground being in the neighbourhood of *Mancunium*‡, the Britons had there deposited a quantity of coals, probably for the use of the garrison; and many of the smaller fragments, and some of the slack, were buried in the sand upon which they were laid. And that the Britons in general were acquainted with this fuel, is evident from its appellation amongst us at present, which is not Saxon, but British; and subsists among

Coal.

Coalery.

History of coals.

* See *Ampetites*.

† L. xxxvi. cap. 26. Augustus placed the statues of four elephants made of it in the temple of Concord.

Whitaker's History of Manchester.

‡ i. e. "the place of tents." An ancient British town, the site of which was the present Castlefield at Manchester.

Coalery. among the Irish in their *O gual*, and among the Cornish in their *kolan*, to this day. Coalery.

The extensive beds of fuel, therefore, with which the kingdom of England and the precincts of Manchester are so happily stored, were first noticed by the skill, and first opened by the labour, of the Britons; and some time before the arrival of the Romans among us. And the nearer quarries in the confines of Bradford, Newton, and Manchester, would naturally attract the notice, and invite the inquiries, of the Britons, before any others. The current of the Medlock, which washes the sides of them, would bring down specimens of the riches within, lodge many of them about the Castlefield, and allure the Britons successively to a collection of the one and a search after the other.

But, even for ages after the discovery, wood continued to compose the general firing of the nation. In 852, a grant was made of some lands by the abbey of Peterborough, under the reservation of certain boons and payments in kind to the monastery; as, one night's entertainment; 10 vessels of Welsh and two of common ale; 60 cart-loads of wood; and 12 of pit-coal; where we see the quantity of coal was only one cart-load to five of wood. The latter naturally continued the principal article of our fuel as long as the forests and thickets presented themselves so ready to the hand: and such it continued till a very late period. The first public notice of the former is mentioned by Mr Hume to have been in the time of Henry III. who in the year 1272, granted a charter to the town of Newcastle, giving the inhabitants a license to dig coals: and the first statute relating to this article was the 9 Henry V. c. 10. ordaining all keels in the port of Newcastle to be measured by commissioners, before carriage of coals, on pain of forfeiture. They were not brought into common use till the reign of Charles I.; and were then sold for about 17s. a chaldron. In some years after the restoration, there were about 200,000 chaldrons burnt in London; in 1670, about 270,000 chaldrons; and at the revolution, upwards of 300,000 chaldrons; and at present, full 600,000 are annually consumed there. There is, besides, an immense consumption in other parts of Britain, and in Ireland. In Scotland, they supply their own consumption, and also export. In Ireland, though they have coal, yet they take annually to the value of 30,000*l.* from England, and 12,000*l.* from Scotland.

There are several other countries in Europe which possess considerable coal-mines; as France, Liege, Germany, and Sweden. Also on the other side of the Atlantic ocean, there has been coal discovered, and wrought; in Newfoundland, Cape Breton, Canada, and some of the New-England provinces. But in all these countries, the coal is of a quality much inferior to the British, and entirely unfit to be used in many manufactures; so that they are obliged to import great quantities from Britain for the use of their manufactures of iron, &c.

Our inland coal-trade, that is, carrying coals from Newcastle, Sunderland, Blith, and other adjacent places in the north of England, as also from the frith of Edinburgh in Scotland, and other places thereabouts, to the city of London, and to the port-towns on the coast all the way, as well on this side of Newcastle,

north, as up the channel as high as Portsmouth west, is a prodigious article, and employs abundance of shipping and seamen; in so much that, in a time of urgent necessity, the coalery navigation alone has been able to supply the government with a body of seamen for the royal navy, able to man a considerable fleet at a very short warning, and that without difficulty, when no other branch of trade would do the like. Likewise the Whitehaven coaleries in Cumberland belonging to Sir James Lowther, furnish several counties in Ireland with coals, and constantly employ upwards of 2000 seamen; which also is a noble nursery for the navy of this kingdom. And not only do the pit-coals sufficiently supply all the ports, but, by means of those ports and the navigable rivers, all the adjacent counties very far inland.

In short, coals, though not an exclusive, yet may, with propriety, be styled a peculiar blessing to Britain, with their great plenty, their acknowledged excellence, and their being found in such places as are conveniently situated for exportation. Nor is there any danger of the export-trade being lessened even by the several duties that have been laid upon them; for the foreign consunt being founded in necessity with regard to manufactures, and in economy where they are used for convenience, (wood and turf being dearer than coals with the duty), we need be in no fear of the markets declining. There is as little room to be alarmed from an apprehension of their being exhausted, as the present works are capable of supplying us for a long series of years, and there are many other mines ready to be opened when these shall fail. Besides, there are known to be coals in many parts of the three kingdoms, which hitherto they have had no encouragement to work.

Besides the value of this commodity as a convenience of life, as an article of commerce, and as giving rise to a nursery of seamen for the increase of the marine; other important advantages deserve to be noticed. Coals are in many respects, and in a very high degree, useful to the landed interest; not only by raising exceedingly the real value, and of course the purchase, of those lands in which they are found, and those through which it is necessary to pass * from the works to the places where they are embarked; but from the general improvements they have occasioned; so that very few counties are now better cultivated than Northumberland, and the same effects they have had in a greater or less degree in other places. Thousands of laborious people are employed in and about the mines; thousands more in conveying them to the ports, and on board the ships; to say nothing of those that draw their subsistence from the carriage of them by land to supply families, &c. There are also great numbers that live in a superior station; as stewards, directors, factors, agents, book-keepers, &c. To these we may add the extraordinary encouragement given to ingenious artists who have invented, and the numerous workmen continually employed about those several curious and costly machines which, for a variety of purposes in this business, are in continual use, and of course in continual wear: we may join to these the multitudes that obtain their living from the many manufactures in which they are employed, and which could

Campbell's
political
Survey.

2
Excellence
of the Brit-
tish coals.

3
Importance
of the coal-
trade.

* These are
emphatically
styled
man-leaves
and are let
at as high
rents as any
landed pro-
perty in
Britain.

could not be carried on but by the help and cheapness of coals. Lastly, the produce of coals exported, which amounts to a very considerable sum, besides being profitable to the owners, merchants, and mariners, is so much clear gain to the nation.

It might be expected, that a trade so beneficial to individuals, and to the nation in general, and which has been gradually increasing for several centuries past, would have been advanced by this time to very great perfection, and reduced to a regular system. But, in one very essential respect, it is found to be quite otherwise. The art of working coal-mines in the most profitable manner is indeed highly improved: but the fundamental of the art, that of searching for and discovering coal in any district of country where it has not yet been found, has never, that we know of, been treated in a systematic manner. The reader, therefore, will not be displeased to find this defect supplied in the course of the present article, together with a detail of all the other operations in the business of coaleries.

The terrestrial matters which compose the solid parts of the earth are disposed in strata, beds, or layers, the under surface of one bearing against, or lying upon, the upper surface of that below it; which last bears or lies on the next below in the same manner.

These strata consist of very different kinds of matter, such as free-stone, lime-stone, metal-stone, or whin-stone, coal, &c. as will be particularly specified in the sequel.

Some of these strata are of a considerable thickness, being often found from 100 to 200 feet or upwards, nearly of the same kind of matter from the superior to the inferior surface; and others are found of the least thickness imaginable, one inch or less.

All these strata are divided or parted from each other laterally, either by their even, smooth, polished surfaces, with very thin lamina of soft or dusty matter betwixt them, called the *parting*, which renders them easy to separate; or else only by the surfaces closely conjoined to each other, without any visible matter interposed betwixt them; yet the different substance of each stratum is not in the least intermixed, though sometimes they adhere so strongly together, that it is very difficult to part or disjoin them: in this last case they are said to have a *bad parting*.

Besides this principal division or parting laterally, there are, in some strata, secondary divisions or partings also laterally, separating, or approaching towards a separation, of the same stratum, into parts of different thicknesses, nearly parallel to each other, in the same manner as the principal partings divide the different strata from each other: but these secondary ones are not so strong or visible, nor make so effectual a parting, as the principal ones do; and are only met with in such strata, as are not of an uniform hardness, texture, or colour, from the upper to the under surface.

There are other divisions or partings, called *backs*, in almost every stratum, which cross the former lateral ones longitudinally, and cut the whole stratum through its two surfaces into long rhomboidal figures. These again are crossed by others called *cutters*, running either in an oblique or perpendicular direction to the last mentioned backs, and also cut the stratum

through its two surfaces. Both these backs and cutters generally extend from the upper or superior stratum down through several of the lower ones; so that these backs and cutters, together with the lateral partings before mentioned, divide every stratum into innumerable cubic, prismatic, and rhomboidal figures, according to the thickness of the stratum, and the position and number of the backs and cutters. They sometimes have a kind of thin partition of dusty or soft matter in them, and sometimes none, like the first mentioned partings; but the softer kind of strata generally have more backs and cutters than the harder kind, and they do not extend or penetrate through the others.

To explain this a little further, let A, B, C, D, E, F, G, (fig. 1.) represent the principal partings before mentioned; or the upper and under surfaces of any stratum; then a, b, c, d, e, f, g will represent the secondary lateral partings nearly parallel to the principal ones; g, h, i, k, l, m , the longitudinal partings called *backs*; n, o, p, q, r, s , the cross partings called *cutters*, crossing the last mentioned ones either obliquely or perpendicularly.

In all places where the strata lie regular, they are divided and subdivided in the manner above mentioned; and sometimes in this manner extend through a pretty large district of country: though it is often otherwise; for their regularity is frequently interrupted, and the strata broken and disordered, by sundry chafms, breaches, or fissures, which are differently denominated according to their various dimensions, and the matters with which they are filled, viz. dikes, ditches, and troubles, which shall be explained in order.

Dikes are the largest kind of fissures. They seem to be nothing but a crack or breach of the solid strata, occasioned by one part of them being broken away and fallen from the other. They generally run in a straight line for a considerable length, and penetrate from the surface to the greatest depth ever yet tried, in a direction sometimes perpendicular to the horizon, and sometimes obliquely; the same kind of strata are found lying upon each other in the same order, but the whole of them greatly elevated or depressed, on the one side of the dike as on the other. These fissures are sometimes two or three feet wide, and sometimes many fathoms. If the fissure or dike be of any considerable width, it is generally filled with heterogeneous matter, different from that of the solid strata on each side of it. It is sometimes found filled with clay, gravel, or sand; sometimes with a confused mass of different kinds of stone lying edgewise; and at other times with a solid body of free-stone, or even whin-stone. When the fissure is of no great width, as suppose two or three feet only, it is then usually found filled with a confused mixture of the different matters which compose the adjoining strata, consolidated into one mass. If a dike runs or stretches north and south, and the same kind of strata are found on the east side of the dike, in a situation with respect to the horizon 10 or 20 fathoms lower than on the other side, it is then said to be a *dip-dike* or *downcast-dike* of 10 or 20 fathoms to the eastward;—or counting from the east side, it is then said to be a *rise-like* or *upcast* of so many fathoms westward. If the strata on one side are not much higher or lower with respect to the horizontal

Plate
LXXXI.

5
Dikes.

horizontal

Coalery. rizontal line, than those on the other, but only broken off and removed to a certain distance, it is then said to be a dike of so many fathoms thick; and from the matter contained between the two sides of the fissure or dike, it is denominated a *clay-dike*, *stone-dike*, &c.

6
Hitches.

A *hitch* is only a dike or fissure of a smaller degree, by which the strata on one side are not elevated or separated from those on the other side above one fathom. These hitches are denominated in the same manner as dikes, according to the number of feet they elevate or depress the strata.

There are dikes (though they are not often met with in the coal-countries) whose cavities are filled with sparr, the ores of iron, lead, vitriol, or other metallic or mineral matters; and it is pretty well known, that all metallic veins are nothing else than what in the coal-countries are called *dikes*.

The strata are generally found lying upon each other in the same order on one side of the dike as on the other, as mentioned above, and nearly of the same thickness, appearing to have been originally a continuation of the same regular strata, and the dike only a breach by some later accident, perpendicularly or obliquely down through them by which one part is removed to a small distance, and depressed to a lower situation than the other. But this is not the only alteration made in the strata by dikes; for generally to a considerable distance on each side of the dike, all the strata are in a kind of shattered condition, very tender, easily pervious to water, and debased greatly in their quality, and their inclination to the horizon often altered.

7
Troubles.

Troubles may be denominated dikes of the smallest degree; for they are not a real breach, but only an approach towards it which has not taken a full effect. The strata are generally altered by a trouble from their regular sit to a different position. When the regular course of the strata is nearly level, a trouble will cause a sudden and considerable ascent or descent: where they have, in their regular situation, a certain degree of ascent or descent, a trouble either increaseth it or alters it to a contrary position: and a trouble has these effects upon the strata in common with dikes, that it greatly debaseth them from their original quality; the partings are separated; the backs and cutters disjoined, and their regularity disordered; the original cubic and prismatic figures, of which the strata were composed, are broken, and the dislocation filled with heterogeneous matter; and the whole strata are reduced to a softer and more friable state.

8
Dip and
rise of the
strata.

The strata are seldom or never found to lie in a true horizontal situation; but generally have an inclination or descent, called the *dip*, to some particular part of the horizon. If this inclination be to the eastward, it is called an *east dip*, and a *west rise*; and according to the point of the compass to which the dip inclines, it is denominated, and the ascent or rise is to the contrary point. This inclination or dip of the strata is found to hold every where. In some places, it varies very little from the level; in others, very considerably; and in some so much, as to be nearly in a perpendicular direction: but, whatever degree of inclination the strata have to the horizon, if not interrupted by dikes, hitches, or troubles, they are always

found to lie in the first regular manner mentioned. They generally continue upon one uniform dip until they are broken or disordered by a dike, hitch, or trouble, by which the dip is often altered, sometimes to a different part of the horizon, and often to an opposite point; so that on one side of a dike, hitch, or trouble, if the strata have an east dip, on the other side they may have an east rise, which is a west dip; and in general, any considerable alteration in the dip is never met with, but what is occasioned by the circumstances last mentioned.

To illustrate what has been said, see fig. 2. where Plate LXXXI.
a b c d, &c. represents a course of strata lying upon each other, having a certain inclination to the horizon. *A B*, is a downcast-dike, which depresseth the strata obliquely to *e f g h*, &c. lying upon each other in the same order, but altered in their inclination to the horizon. *C D* represents a clay or free-stone dike, where the strata are neither elevated nor depressed, but only broken off and removed to a certain distance. *E F*, represents a hitch, which breaks off and depresseth the strata only a little, but alters their inclination to the horizon. *G H*, represents a trouble, where the strata on one side are not entirely broken off from those on the other, but only in a crushed and irregular situation.

As some particular strata are found at some times to increase, and at other times to diminish, in their thickness, whilst others remain the same, consequently they cannot be all parallel; yet this increase and diminution in their thickness comes on very gradually.

The strata are not found disposed in the earth according to their specific gravities: for we often find strata of very dense matter near the surface; and perhaps at 50 or even 100 fathoms beneath, we meet with strata of not half the specific gravity of the first. A stratum of iron ore is very often found above one of coal, though the former has twice the gravity of the latter; and, in short, there is such an absolute uncertainty in forming any judgment of the disposition of the strata from their specific gravities, that it cannot in the least be relied upon.

It has been imagined by many, that hills and valleys are occasioned by those breaches in the strata before mentioned called *dikes*; but this is contradicted by experience. If it was so, we should meet with dikes at the skirts of the hills, and by the sides of valleys, and the sea-shore; but instead of that, we generally find the strata lying as uniformly regular under hills and valleys, and beneath the bottom of the sea (as far as has been yet tried), as in the most campaign countries. It may happen, indeed, that a dike is met with in some of these places; but that being only a casual circumstance, can never be admitted as a general cause. Whatever irregularities are occasioned in the solid strata by dikes, or other breaches, are commonly covered over and evened by those beds of gravel, clay, sand or soil, which lie uppermost, and form the outward surface of the earth. Wherever these softer matters have been carried off, or removed by accident, as on the tops of hills and the sides of valleys, there the solid strata are exposed, and the dip and rise and other circumstances of them may be examined; but no certain conclusions can be drawn, merely

merely from the unevenness and inequalities of the outward surface.

The preceding observations, upon the general disposition of the solid strata, are equally applicable to the strata of coal as to those of stone or other matter.

9
Description
of the strata
connected
with
coal.

We shall next give an account of the several strata of coal, and of stone and other matters, which are usually connected with coal, and are found to have a particular affinity with it: and, for the sake of distinction, shall arrange them into six principal classes, which will include all the varieties of strata that have been found to occur in all those districts of country both in Scotland and England where coal abounds.

1. *Of Whin-stone.*] The strata of what is denominated whin-stone are the hardest of all others; the angular pieces of it will cut glass; it is of a very coarse texture, and when broke across the grain exhibits the appearance of large grains of sands half vitrified; it can scarcely be wrought, or broke in pieces, by common tools without the assistance of gun-powder; each stratum is commonly homogeneous in substance and colour, and cracked in the rock to a great depth. The most common colours of these strata are black or dark blue, yet there are others of it ash-coloured and light brown. Their thickness in all the coal countries is but inconsiderable, from six or five feet down to a few inches; and it is only in a few places they are met with of these thicknesses. In the air it decays a little, leaving a brown powder; and in the fire it cracks, and turns reddish brown. Limestone, and what is called *bastard limestone*, is sometimes, tho' rarely, met with in coaleries. It is a well known stone; but from its resemblance in hardness and colour is often mistaken for a kind of whin. Sometimes, particularly in hilly countries, the solid matter next the surface is found to be a kind of soft or rotten whin;—but it may be noted, that this is only a mass of heterogeneous matter disposed upon the regular strata; and that beneath this, all the strata are generally found in as regular an order as where this heterogeneous matter does not occur.

2. *Of Poft-stone.*] This is a free stone of the hardest kind, and next to the limestone with respect to hardness and solidity. It is of a very fine texture; and when broken appears as if composed of the finest sand. It is commonly found in a homogeneous mass, tho' variegated in colour; and, from its hardness, is not liable to injury from being exposed to the weather. Of this kind of stone there are four varieties, which may be distinguished by their colour: the most common is white poft, which in appearance is like Portland stone, but considerably harder; it is sometimes variegated with streaks or spots of brown, red, or black.

Grey poft is also very common; it appears like a mixture of fine black and white sand: it is often variegated with brown and black streaks, the last mentioned appear like small clouds composed of particles of coal.

Brown or yellow poft is often met with of different degrees of colour; most commonly of the colour of light ochre or yellow sand: it is as hard as the rest, and sometimes variegated with white and black streaks.

Red poft is generally of a dull red colour: this is

but rarely met with; it is often streaked with white or black.

All these lie in strata of different thicknesses; but commonly thicker than any other strata whatever: they are separated from each other, and from other kind of strata, by partings of coal, sand, or soft matter of different colours which are very distinguishable.

3. *Of Sand-stone.*] This is a free stone of a coarser texture than poft, and not so hard; is so lax as to be easily pervious to water; when broke, is apparently of a coarse sandy substance; is friable and moulders to sand when exposed to the wind and rain; has frequently white shining spangles in it, and pebbles or other small stones inclosed in its mass. Of this, there are two kinds commonly met with, distinguished by their colours, grey and brown, which are of different shades, lighter or darker, in proportion to the mixture of white in them. It is most generally found in strata of considerable thickness, without many secondary partings; and sometimes, tho' rarely, it is subdivided into layers as thin as the common grey slate. It has generally sandy or soft partings.

4. *Of Mettle-stone.*] This is a tolerable hard stratum, being in point of hardness next to sand-stone; generally solid, compact, of considerable weight, and of an argillaceous substance, containing many nodules or balls of iron ore, and yellow or white pyrites; its partings, or the surfaces of its strata, are hard polished and smooth as glass. When broke, it has a dull dully appearance, (tho' of a fine texture), like hard dried clay mixed with particles of coal. Tho' hard in the mine or quarry, when exposed to the fresh air it falls into very small pieces. The most usual colour of this stone is black; but there are several other lighter colours, down to a light brown or grey. It is easily distinguished from free-stone by its texture and colour, as well as by its other characteristics. It lies in strata of various thicknesses, tho' seldom so thick as the two last mentioned kinds of stone.

5. *Of Shiver.*] This stratum is more frequently met with in coaleries than any other. There are many varieties of it, both in hardness and colour; but they all agree in one general characteristic. The black colour is most common; it is called by the miners *black shiver*, *black mettle*, or *bleas*. It is softer than mettle-stone, and in the mine is rather a tough than a hard substance, is not of a solid or compact matter, being easily separable, by the multitude of its partings, &c. into very small parts, and readily absorbing water. The substance of this stratum, is an indurated bole, commonly divided into thin lamina of unequal thicknesses, which break into long small pieces when struck with force; and, on examination, they appear to be small irregular rhomboids: each of these small pieces has a polished glassy surface; and, when broke across the grain, appears of a dry leafy, or laminated texture, like exceeding fine clay: it is very friable; feels to the touch like an unctuous substance; and dissolves in air or water to a fine pinguid black clay. There are almost constantly found inclosed in its strata, lumps or nodules of iron ore; often real beds of the same.

There are other colours of this stratum besides black. The brown or dun shiver is very frequently

Coalery.

met with, it agrees with the above description in every thing but colour. Grey shiver is also very common: it seems to be only a mixture of the black and dun; and by the different degrees of mixture of these colours others are produced. It lies in strata sometimes of considerable thickness, at other times not exceeding a few feet; they are commonly parted from each other by lamina of spar, coal, or soft matter.

6. *Of Coal.*] Referring the reader, for the scientific division of coals, to the articles *AMPELITES* and *LITHANTHRAX*, we shall here consider them as distinguishable into three kinds, according to their degrees of inflammability.

1. The least inflammable kinds, are those known by the name of *Welsh coal*, which is found in Wales; *Kilkenny coal*, which is found near Kilkenny in Ireland; and *blind or deaf coal*, which is found in many parts of Scotland and England. This coal takes a considerable degree of heat to kindle it, but when once thoroughly ignited will burn a long time; it remains in the fire in separate pieces without sticking together or caking; it produceth neither flame nor smoke, and makes no cinder, but burns to a white stony flagg; it makes a hot glowing fire like charcoal or cinders; and emits effluvia of a suffocating nature which renders it unfit for burning in dwelling-houses, its chief use being amongst maltsters, dyers, &c. for drying their commodities. 2. *Open burning coal*, soon kindles, making a hot pleasant fire, but is soon consumed: it produceth both smoke and flame in abundance; but lies open in the fire, and does not cake together so as to form cinders, its surface being burnt to ashes before it is thoroughly calcined in the midst; from this it has its name of an *open burning coal*; it burns to white or brown ashes very light. Of this kind is *canal-coal*, *jett*, *parrot*, *splint*, and most of the coals in Scotland. 3. *Close burning coal*, kindles very quickly, makes a very hot fire, melts and runs together like bitumen, the very smallest culm making the finest cinders, which being thoroughly burnt are porous and light as a pumice stone, and when broke are of a shining lead colour; it makes a more durable fire than any other coal, and finally burns to brown or reddish coloured heavy ashes. Of this kind are the *Newcastle* and several other of the English coals, and the *smithy coals* of Scotland. The open burning and the close burning coal mixed together, make a more profitable fire for domestic uses than either of them separate.

In all those districts of country where coal is found, there are generally several strata of it; perhaps all the different kinds above mentioned will be found in some, and only one of the kinds in others; yet this one kind may be divided into many different seams or strata, by beds of shiver or other kinds of matter interposing, so as to give it the appearance of so many separate strata.

All these strata above described, with their several varieties, do not lie or bear upon each other in the order in which they are described, nor in any certain or invariable order. Though there be found the same kinds of strata in one coalery or district as in another, yet they may be of very different thicknesses. In some places there are most of the hard kinds, in others

most of the softer; and in any one district it rarely happens that all the various kinds are found; for some kinds, perhaps, occur only once or twice, whilst others occur 10 or 20 times before we reach the principal stratum of coal.

In order to explain this, suppose the strata in the pit at A (fig. 3.) lie in the order *a, b, c, d, &c.* they may be so much altered in their thicknesses, by reason of some of them increasing and others diminishing, at the distance of B, that they may be found there of very different thicknesses; or if they are examined in a pit at D, by reason of its lower situation, and the strata there not being a continuation of those in the other places, they may be very different both in their order and thicknesses, and yet of the same kinds.

Though they be thus found very different in one coalery or district from what they are found to be in another, with respect to their thicknesses, and the order in which they lie upon each other, yet we never meet with a stratum of any kind of matter but what belongs to some of those above described.

To illustrate how the various strata lie in some places, and how often the same stratum may occur betwixt the surface and the coal, we shall give the following example. The numbers in the left hand column refer to the classes of strata before described, to which each belongs. The second column contains the names of the strata; and the four numeral columns to the right hand, express the thickness of each stratum, in fathoms, yards, feet, and inches.

EXAMPLE.				
N ^o		Fa	Yds	Fe
	Soil and gravel	0	1	10
	Clay mixed with loose stones	1	1	0
3	Coarse brown sand-stone, with soft partings	3	0	2
2	White post, with shivery partings	1	10	5
5	Black shiver or bleas, with iron-stone balls	2	0	2
6	Coarse splint coal	0	0	2
5	Soft grey shiver	0	1	0
2	Brown and grey post, streaked with black	1	0	2
5	Black shiver, with beds and balls of iron-stone	0	1	2
4	Grey and black mottle-stone	0	1	1
2	White and brown post	1	1	0
5	Black and grey shiver, streaked with white	0	1	0
3	Soft grey sand-stone, with shivery partings	0	1	1
2	Yellow and white post, with sandy partings	1	0	2
5	Black and dun shiver, with iron-stone balls	0	1	2
2	White post streaked with black, and black partings	1	0	0
5	Grey shiver, with iron-stone balls	0	1	0
4	Brown and black mottle-stone	1	1	2
5	Hard slatey black shiver	1	1	0
6	Coal, hard and fine splint	0	0	3
5	Soft black shiver	0	0	3
6	Coal, fine and clear	0	0	3
5	Hard black shiver	0	0	1
Total Fathoms,		25	0	0

In this instance the species of sand-stone only occurs twice, post five times, whilst the shiver occurs no less than nine times.

To apply the foregoing observations to practice.

Suppose it was required to examine whether there was coal in a piece of ground adjoining to, or in the neighbourhood, of other coaleries.

In the first place, it is proper to be informed, at some of the adjacent coaleries, of the number and kinds of

Coalery.

Plate
LXXXI.

10
The order
in which
they lie.

11
Methods of
searching
for coal.

Coalery. of strata; the order in which they lie upon each other; to what point of the horizon, and in what quantity, they dip; if any dikes, hitches, or troubles, and the course they stretch. Having learnt these circumstances, search in the ground under examination where the strata are exposed to view, and compare these with the other. If they be of the same kinds, and nearly correspond in order and thickness, and be lying in a regular manner, and agree by computation with the dip and rise, it may safely be concluded the coal is there; and the depth of it may be judged from the depth of the coal in the other coalery, below any particular stratum which is visible in this.

Rule 2d. If the solid strata are not exposed to view, neither in the hills nor valleys of the ground under examination, then search in the adjoining grounds; and if the same kind of strata are found there as in the adjacent coalery, and there is reason, from the dip and other circumstances, to believe that they stretch through the ground to be examined; it may then be concluded that the coal is there, as well as these other strata.

Plate LXXXI. Suppose a coalery is on the side of a hill at A, fig. 2. and you would search for a coal at B, on the other side of the hill, but in a much lower situation; by observing the several strata lying above the coal at A, and the point to which they dip, which is directly towards B, (if clear of dikes,) you may expect to find the same kind of strata on the other side of the hill, but much lower down. Accordingly, if some of the strata are visible in the face of the precipice C, they may be compared with some of those in the pit at A. Or, if they are not to be seen there, by searching in the opposite hill, they may perhaps be discovered at the place F; where, if they be found in the manner before mentioned, and there be reason to believe they extend regularly from the first place to this, it is more than probable the coal, as well as these strata, will be found in the intermediate ground.

Rule 3d. If the ground to be examined lie more to the rise of the coal, as at E, which being supposed to be on a flat, perhaps the solid strata there may be wholly covered by the gravel, clay, &c. of the outward surface lying upon them: In this case, by measuring the horizontal distance and the descent of ground from A to E, and computing the quantity of ascent or rise of the coal in that distance; by comparing these together, it may be judged at what depth the coal will be found there, allowing that it lie regular. Thus, suppose the coal at A 80 yards deep, the distance from A to E 500 yards, and that the coal rises 1 yard in 10 yards of horizontal distance:

Then, from the depth of the pit - 80
Deduct the descent of ground from A to E,
suppose - - - 24

This remainder would be the depth, if the coal was level - 56

But as the coal rises 1 in 10 feet, then deduct what it rises in 500 yards, which is 50

And the remainder is the depth of that coal at E - - - 6 Yards.

Rule 4th. Or suppose that the place at B is 500 yards the contrary way, or to the full dip of the coal at A; if a

view of the solid strata cannot be obtained, then by proceeding in the same manner as before, the depth of the coal at that place may be computed. Thus,

To the depth of the coal at the pit A - 80
Add the descent or inclination of the coal in 500 yards, which, as before, is - 50

This sum would be the depth, if the ground was level - 130

But as the ground descends towards B, deduct the quantity of that, which suppose 80

Remains the depth of the coal at B 50

If the place to be examined be neither to the full dip nor full rise, but in some proportion towards either, the same method may be pursued, computing how much the coal rises or dips in a certain distance in that direction.

If there is known to be a dike in the workings of the pit at A, which elevates or depresseth the strata towards the place under examination, then the quantity of the elevation or depression must be accordingly added to or deducted from the computed depth of the coal at that place. Suppose there is an upcast dike of 10 fathoms or 20 yards towards B, then deduct 20 from 50, the depth before computed, there will remain 30 yards or 15 fathoms for the depth of the coal at B.

But it often happens that coal is to be searched for, in a part of the country, at such a considerable distance from all other coaleries, that by reason of the intervention of hills, valleys, unknown dikes, &c. the connection or relation of the strata with those of any other coalery cannot be traced by the methods last mentioned; in which case a more extensive view must be taken of all circumstances than was necessary in the former; and a few general rules founded on the foregoing observations, and on conclusions drawn from them, will greatly assist in determining, sometimes with a great degree of probability, and sometimes with absolute certainty, whether coal be in any particular district of country or not.

The first proper step to be taken in such a case, is to take a general view of that district of country intended to be searched, in order to judge, from the outward appearance or face of the country; which particular part out of the whole is the most likely to contain those kind of strata favourable to the production of coal; and consequently such particular part being found, is the most advisable to be begun with in the examination.

Though the appearance of the outward surface gives no certain or infallible rule to judge of the kinds of strata lying beneath, yet it gives a probable one: for it is generally found, that a chain of mountains or hills rising to a great height, and very steep on the sides, are commonly composed of strata much harder and of different kinds from those before described wherein coal is found to lie, and therefore unfavourable to the production of coal; and these mountainous situations are also more subject to dikes and troubles, than the lower grounds, so that if the solid strata composing them gave even favourable symptoms of coal,

Coalery.		Coalery.
Hills and Valleys.	<p>yet the last circumstance would render the quality bad, and the quantity precarious ; and, on the whole, it may be observed, that mountainous situations are found more favourable to the production of metals than of coal. It is likewise generally found that those districts abounding with valleys, moderately rising hills, and interspersed with plains sometimes of considerable extent, do more commonly contain coal, and those kinds of strata favourable to its production, than either the mountainous or champaign countries ; and a country so situated as this last described, especially if at some considerable distance from the mountains, ought to be the first part appointed for particular examination. Plains, or level grounds of great extent, generally situated by the sides of rivers, or betwixt such moderate rising grounds as last described, are also very favourable to the production of coal, if the solid strata, and other circumstances in the higher grounds adjoining, be conformable ; for it will scarcely be found, in such a situation, that the strata are favourable in the rising grounds on both sides of the plain, and not so in the space betwixt them. Though plains be so favourable, in such circumstances, to the production of coal, yet it is often more difficult to be discovered in such a situation, than in that before described ; because, the clay, soil, and other lax matter, brought off the higher grounds by rains and other accidents, have generally covered the surface of such plains to a considerable depth, which prevents the exploration of the solid strata there, unless they be exposed to view by digging, quarrying, or some such operation.</p> <p>That part of the district being fixed upon which abounds with moderate hills and valleys as properest to begin the examination at, the first step to be taken is to examine all places where the solid strata are exposed to view, (which are called the <i>crops</i> of the strata), as in precipices, hollows, &c. tracing them as accurately and gradually as the circumstances will allow, from the uppermost stratum or highest part of the ground to the very undermost : and if they appear to be of the kinds before described, it will be proper to note in a memorandum book their different thicknesses ; the order in which they lie upon each other ; the point of the horizon to which they dip or incline, and the quantity of that inclination ; and whether they lie in a regular state. This should be done in every part of the ground where they can be seen : observing at the same time, that if a stratum can be found in one place, which has a connection with some other in a second place, and if this other has a connection with another in a third place, &c. ; then, from these separate connections, the joint correspondence of the whole may be traced, and the strata, which in some places are covered, may be known by their correspondence with those which are exposed to view.</p> <p>If by this means the crops of all the strata cannot be seen, (which is often the case), and if no coal be discovered by its crop appearing at the surface ; yet if the strata that have been viewed consist of those kinds before described, and are found lying in a regular order, it is sufficiently probable that coal may be in that part of the district, although it be concealed from sight by the surface of earth or other matter.</p>	Rule 6th.
	<p>Therefore, at the same time that the crops of the strata are under examination, it will be proper to take notice of all such springs of water as seem to be of a mineral nature, particularly those known by the name of iron water, which bear a mud or sediment of the colour of rusty iron, having a strong astringent taste. Springs of this kind proceed originally from those strata which contain beds or balls of iron-ore ; but by reason of the tenacity of the matter of those strata, the water only disengages itself slowly from them, descending into some more porous or open stratum below, where, gathering in a body, it runs out to the surface in small streams or rills. The stratum of coal is the most general reservoir of this water ; for the iron-stone being lodged in different kinds of shiver, and the coal commonly connected with some of them, it therefore descends into the coal, where it finds a ready passage through the open backs and cutters. Sometimes, indeed, it finds some other stratum than coal to collect and transmit it to the surface ; but the difference is easily distinguishable ; for the ochrey matter in the water, when it comes from a stratum of coal, is of a darker rusty colour than when it proceeds from any other, and often brings with it particles and small pieces of coal ; therefore, wherever these two circumstances concur in a number of these kind of springs, situated in a direction from each other answerable to the stretch or to the inclination of the strata, it may be certain the water comes off coal, and that the coal lies in a somewhat higher situation than the apertures of the springs.</p> <p>There are other springs also which come off coal, and are not distinguishable from common water, otherwise than by their astringency, and their having a blue scum of an oily or glutinous nature swimming upon the surface of the water. These, in common with the others, bring out particles of coal, more especially in rainy seasons when the springs flow with rapidity. When a number of these kinds are situated from each other in the direction of the strata, as above described ; or if the water does not run forth as in springs, but only forms a swamp, or an extension of stagnant water beneath the turf ; in either case, it may be depended upon that this water proceeds from a stratum of coal.</p> <p>If the stratum of coal is not exposed to view, or cannot be discovered by the first method of searching for the crop, although the appearance of the other strata be very favourable, and afford a strong probability of coal being there ; and if the last-mentioned method of judging of the particular place where the crop of the coal may lie, by the springs of water issuing from it, should, from the deficiency of those springs or other circumstances, be thought equivocal, and not give a satisfactory indication of the coal ; then a further search may be made in all places where the outward surface, or the stratum of clay or earth, is turned up by plowing, ditching, or digging, particularly in the lower grounds, in hollows, and by the sides of streams. These places should be strictly examined, to see if any pieces of coal be intermixed with the substance of the superior lax strata ; if any such be found, and if they be pretty numerous and in detached pieces, of a firm substance, the angles perfect or not</p>	Rule 7th.

Fig. 1.

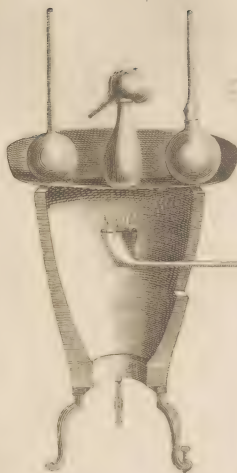
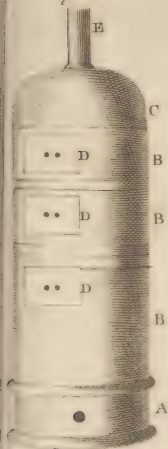


Fig. 8.



Fig. 6.

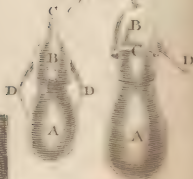


Fig. 3.



Fig. 5.

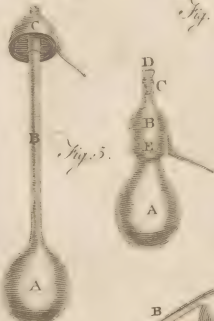


Fig. 2.

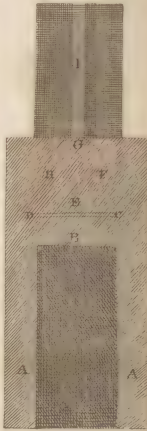


Fig. 7.

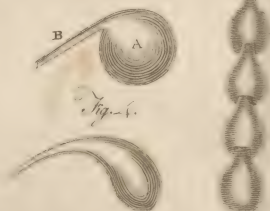


Fig. 4.





Coalery.

much worn, and the texture of the coal distinguishable, it may be concluded, that the stratum of coal to which they originally did belong, is at no great distance, but in a situation higher with respect to the horizon; and if there be also found along with the pieces of coal, other mineral matter, such as pieces of flint or freestone, this is a concurrent proof, that it has come only from a small distance. Though the two fore-mentioned methods should only have produced a strong probability, yet if this last mentioned place, where the pieces of coal, &c. are found in the clay, be in a situation lower than the springs; when this circumstance is joined to the other two, it amounts to little less than a moral certainty of the stratum of coal being a very little above the level of the springs. But if, on the contrary, these pieces of coal are found more sparingly interperfed in the superior stratum, and if the angles are much fretted or worn off, and very little of other kinds of mineral matter connected with them; it may then be concluded, that they have come from a stratum of coal situated at a greater distance than in the former case; and by a strict search and an accurate comparison of other circumstances, that particular place may be discovered with as much certainty as the other.

After the place is thus discovered, where the stratum of coal is expected to lie concealed, the next proper step to be taken, is to begin digging a pit or hole there perpendicularly down to find the coal. If the coal has no solid strata above and beneath it, but be found only embodied in the clay or other lax matter, it will not be there of its full thickness, nor so hard and pure as in its perfect state when enclosed betwixt two solid strata, the uppermost called the *roof*, and the undermost called the *pavement*, of the coal: in such situation therefore it becomes necessary, either to dig a new pit, or to work a mine forward until the stratum of coal be found included betwixt a solid roof and pavement, after which it need not be expected to increase much in its thickness: yet as it goes deeper or farther to the dip, it most likely will improve in its quality; for that part of the stratum of coal which lies near the surface, or only at a small depth, is often debased by a mixture of earth and sundry other impurities, washed down from the surface, through the backs and cutters by the rains; whilst the other part of the stratum which lies at a greater depth is preserved pure, by the other solid strata above it, intercepting all the mud washed from the surface.

The above methods of investigation admit of many different cases, according to the greater or less number of favourable circumstances attending each of the modes of inquiry; and the result accordingly admits every degree of probability, from the most distant even up to absolute certainty. In some situations, the coal will be discovered by one method alone; in others, by a comparison of certain circumstances attending each method; whilst in some others, all the circumstances that can be collected only lead to a certain degree of probability.

In the last case, where the evidence is only probable, it will be more advisable to proceed in the search by boring a hole through the solid strata (in the manner hereafter described), than by digging or sinking a

pit, it being both cheaper and more expeditious; and in every case, which does not amount to an absolute certainty, this operation is necessary, to ascertain the real existence of the coal in that place.

We shall now suppose, that having examined a certain district, situate within a few miles of the sea or some navigable river, that all the circumstances which offer only amount to a probability of the coal being there, and that boring is necessary to ascertain it, we shall therefore describe the operation of boring to the coal; then the method of clearing it from water, commonly called *winning* it; and all the subsequent operations of working the coal and raising it to the surface, leading it to the river or harbour, and finally putting it on board the ships.

Suppose that the ground, A, B, C, D, fig. 4. has been examined, and from the appearance of the strata for where they are visible (as at the precipice D, and several other places) they are found to be of those kinds usually connected with coal, and that the point to which they rise is directly west towards A, but the ground being flat and covered to a considerable depth with earth, &c. the strata cannot be viewed in the low grounds; therefore, in this and all similar situations, the first hole that is bored for a trial for coal should be on the west side of the ground, or to the full rise of the strata as at A, where, boring down through the strata 1, 2, 3, suppose 10 fathoms, and not finding coal, it will be better to bore a new hole than to proceed to a great depth in that: therefore, proceeding so far to the eastward as B, where the stratum 1, of the first hole is computed to be 10 or 12 fathoms deep, a second hole may be bored, where boring down through the strata 4, 5, 6, 7, 8, the stratum 1 is met with, but no coal; it would be of no use to bore farther in this hole, as the same strata would be found which were in the hole A: therefore, proceeding again so far to the eastward, as it may be computed the stratum 4 of the second hole will be met with at the depth of 10 or 12 fathoms, a new hole may be bored at C; where, boring through the strata 9, 10, 11, 12, the coal is met with at 13, before the hole proceed so deep as the stratum 4 of the former. It is evident, that, by this method of procedure, neither the coal nor any other of the strata can be passed over, as the last hole is always bored down to that stratum which was nearest the surface in the former hole.

The purposes for which boring is used, are numerous, and some of them of the utmost importance in coaleries. In coaleries of great extent, although the coal be known to extend through the whole grounds, yet accidental turns, and other alterations in the dip, to which the coal is liable, render the boring of three or more holes necessary, to determine exactly to what point of the horizon it dips or inclines, before any capital operation for the winning of it can be undertaken; because a very small error in this may occasion the loss of a great part of the coal, or at least incur a double expence in recovering it.

Suppose A, B, C, D, fig. 5. to be part of an extensive field of coal, intended to be won or laid dry by a fire-engine; according to the course of the dip in adjoining coaleries, the point C is the place at which the engine should be erected, because the coal dips in direction.

Coalery.

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direction of the line A C, consequently the level line would be in the direction C D; but this ought not to be trusted to. Admit two holes, 1 2, be bored to the coal in the direction of the supposed dip, at 200 yards distance from each other, and a third hole 3 at 200 yards distance from each of them: suppose the coal is found, at the hole 1, to be 20 fathoms deep; at the hole 2, 10 fathoms deeper; but at the hole 3, only 8 fathoms deeper than at 1. Then to find the true level line and dip of the coal, lay, As 10 fathoms the dip from 1 to 2, is to 200 yards the distance, so is 8 fathoms, the dip from 1 to 3, to 160 yards, the distance from 1 on the line 1 2, to *a*, the point upon a level with the hole 3. Again lay, As 8 fathoms, the dip from 1 to 3, is to 200 yards the distance; so is 10 fathoms, the dip from 1 to 2, to 250 yards, the distance from 1, in direction of the line 1, 3, to *b*, the point upon a level with the hole 2. Then let fall the perpendicular 1, *c*, which will be the true direction of the dip of the coal, instead of the supposed line A C; and by drawing E D, and D F, parallel to the other lines, the angle D, and no other place, is the deepest part of the coal, and the place where the engine should be erected. If it had been erected at the angle C, the level line would have gone in the direction *c b*, by which means about one third part of the field of coal would have been below the level of the engine, and perhaps lost, without another engine was erected at D.

Boring not only shews the depth at which the coal lies, but its exact thickness; its hardness; its quality, whether close burning or open burning, and whether any foul mixture in it or not; also the thickness, hardness, and other circumstances of all the strata bored through; and from the quantity of water met with in the boring, some judgment may be formed of the size of an engine capable of drawing it, where an engine is necessary. When holes are to be bored for these purposes, they may be fixed (as near as can be guessed) in such a situation from each other, as to suit the places where pits are afterwards to be sunk; by which means most of the expence may be saved, as these pits would otherwise require to be bored, when sinking, to discharge their water into the mine below. There are many other uses to which boring is applied, as will be explained hereafter.

For these reasons, boring is greatly practised in England, and is brought to great perfection; and as the operation is generally entrusted to a man of integrity, who makes it his profession, the accounts given by him of the thickness and other circumstances of the strata, are the most accurate imaginable, and are trusted to with the greatest confidence; for as very few gentlemen choose to take a lease of a new coalery which has not been sufficiently explored by boring, it is necessary the accounts should be faithful, being the only rule to guide the landlord in letting his coal, and the tenant in taking it. In Scotland it is not so generally practised; nor are there any men of character who are professed borers, that operation being commonly left to any common workman; whence it happens, that it never has been in any esteem, the accounts given by them being so imperfect and equivocal as not to merit any confidence.

Coalery.

The tools or instruments used in boring are very simple. The boring rods are made of iron from 3 to 4 feet long, and about one inch and a half square, with a screw at each end, by which they are screwed together, and other rods added as the hole increases in depth. The chisel is about 18 inches long, and two and a half broad at the end, which being screwed on at the lower end of the rods, and a piece timber put through an eye at the upper end, they are prepared for work. The operation is performed by lifting them up a little, and letting them fall again, at the same time turning them a little round; by a continuance of which motions, a round hole is fretted or worn through the hardest strata. When the chisel is blunt, it is taken out, and a scooped instrument called a *wimble* put on in its stead; by which the dust or pulverised matter which was worn off the stratum in the last operation is brought up. By this subsistence, the borers know exactly the nature of the stratum they are boring in; and by any alteration in the working of the rods, (which they are sensible of by handling them) they perceive the least variation of the strata. The principal part of the art depends upon keeping the hole clean, and observing every variation of the strata with care and attention.

The established price of boring in England is 5 s. *per* fathom for the first five fathoms, 10 s. *per* fathom for the next five fathoms, and 15 s. *per* fathom for the next five fathoms; and so continually increasing 5 s. *per* fathom at the end of every five fathoms; the borer finding all kinds of boring instruments, and taking his chance of the hardness of the strata, except above one foot in thickness of whin occur, when the former price ceases, and he is paid *per* day.

It is exceedingly uncommon to meet with a stratum of coal which is naturally dry, or whose subterranean springs or feeders of water are so very small as to require no other means than the labour of men to draw off or conduct them away; for it most commonly happens, that the stratum of coal, and the other strata adjacent, abound so much in feeders of water, that, before access can be had to the coal, some other methods must be pursued to drain or conduct away these feeders: therefore, after the deepest part of the coal is discovered, the next consideration is of the best method of draining it, or, in the miner's language, of *winning* the coal.

If the coal lies in such an elevated situation, that a part of it can be drained by a level brought up from the lower grounds, then that will be the most *natural* method; but whether it be the most *proper* or not, depends upon certain circumstances. If the situation of the ground be such, that the level would be of a great length, or have to come through very hard strata, and the quantity of coal it would drain, or the profits expected to be produced by that coal, should be inadequate to the expence of carrying it up; in such case some other method of winning might be more proper. Or suppose, in another case, it be found, that a level can be had to a coalery, which will cost L. 2000, and require five years to bring it up to the coal, and that it will drain 30 acres of coal when completed; yet if it be found that a fire engine, or some other machine, can be erected on that coalery, for the same sum of money,

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Galery.

money, in one year, which will drain 50 acres of the same coal, then this last would be a more proper method than the level; because four years profit would be received by this method before any could come in by the other; and after the 30 acres drained by the level is all wrought, a machine of some kind would nevertheless be necessary to drain the remaining 20 acres: so that erecting a machine at first would be on all accounts the most advisable.

Where a level can be drove, in a reasonable time, and at an adequate expence, to drain a sufficient tract of coal, it is then the most eligible method of winning; because the charge of upholding it is generally less than that of upholding fire-engines or other machines.

If a level is judged properest after consideration of every necessary circumstance, it may be begun at the place appointed in the manner of an open ditch, about three feet wide, and carried forward until it be about six or seven feet deep from the surface, taking care to secure the bottom and sides by timber-work or building; after which it may be continued in the manner of a mine about three feet wide, and three feet and a half high, through the solid strata, taking care all along to keep the bottom upon a level, and to secure the roof, sides, and bottom, by timber or building, in all places where the strata are not strong enough to support the incumbent weight, or where they are liable to decay by their exposure to the fresh air. If the mine has to go a very long way before it reach the coal, it may be necessary to sink a small pit, for the convenience of taking out the stones and rubbish produced in working the mine, as well as to supply fresh air to the workmen; and if the air should afterwards turn damp, then square wooden pipes made of staves closely jointed, (commonly called air-boxes), may be fixed in the upper part of the mine, from the pit-bottom all the way to the end of the mine, which will cause a sufficient circulation of fresh air for the workmen; perhaps in a great length it will be found proper to sink another or more pits upon the mine, and by proceeding in this manner it may be carried forward until it arrive at the coal; and after driving a mine in the coal a few yards to one side, the first coal-pit may be sunk.

If a level is found impracticable, or for particular reasons unadvisable; then a fire-engine*, or some other machine, will be necessary, which should be fixed upon the deepest part of the coal, or at least so far towards the dip as will drain a sufficient extent of coal, to continue for the time intended to work the coalery; and whether a fire-engine, or any other machine, is used, it will be of great advantage to have a partial level brought up to the engine-pit, if the situation of the ground will admit it at a small charge, in order to receive and convey away the water without drawing it so high as to the surface: for if the pit was 30 fathoms deep to the coal, and if there was a partial level, which received the water five fathoms only below the surface, the engine by this means would be enabled to draw 1-6th part more water than without it; and if there were any feeders of water in the pit above this level, they might be conveyed into it, where they would be discharged without being drawn by the engine.

Coalery.

The engine-pit may be from seven to nine feet wide; and whether it be circular, oval, or of any other form, is not very material, provided it be sufficiently strong, though a circular form is most generally approved. If any feeders of water are met with a few fathoms from the surface, it will be proper to make a circular or spiral cutting about one foot deep, and a little hollowed in the bottom, round the circumference of the pit, in order to receive and conduct the water down, without flying over the pit and incommoding the workmen. If the strata are of so tender or friable a nature as not to bear this operation, or if the water leaks through them, then it will be necessary to insert in the forementioned cutting a circular piece of timber called a *crib*, hollowed in the same manner to collect the water; and a second may be inserted two or three yards below the first, with a sloping notch down the wall or side of the pit, to convey the water from the former into it; proceeding by some of these methods until the pit is sunk 15 or 20 fathoms; at which place it would be proper to fix a cistern or reservoir, for the first or upper set of pumps to stand in; for if the pit be 30 fathoms as supposed, it would be too great a length for the pumps to be all in one set from bottom to top; therefore, if any extraordinary feeders are met with, betwixt 15 and 20 fathoms deep, it would be best to fix the cistern where it may receive them, and prevent their descending to the bottom; observing that the upper set of pumps be so much larger than the lower one, as the additional feeders may require; or if there are no additional feeders, it ought then to be a little smaller.

After the upper cistern is fixed, the operation may be pursued by the other set of pumps in much the same manner as has been described, until the pit is sunk to the coal; which being done, it would be proper to sink it six or eight feet deeper, and to work some coal out from the dip side of the pit, to make room for a large quantity of water to collect, without incommoding the coal-pits when the engine is not working.

It would exceed the proper bounds of this article, to enumerate all the accidents to which engine-pits are liable in sinking; we shall therefore only recite a few which seem important.

If a quicksand happen to lie above the solid strata, next the surface, it may be got through by digging the pit of such a wideness at the top (allowing for the natural slope or running of the sand) as to have the proper fix of the pit on the uppermost solid stratum; where fixing a wooden frame or tube as the timber-work of the pit, and covering it round on the outside with wrought clay up to the top, the sand may again be thrown into the excavation round the tube, and levelled with the surface.

If the quicksand should happen to lie at a considerable depth betwixt the clay and solid strata, then a strong tube of timber closely jointed and shod with iron, of such a diameter as the pit will admit, may be let down into it; and by fixing a great weight upon the top, and by working out the sand, it may be made to sink gradually, until it come to the rock or other solid stratum below; and when all the sand is got out, if it be lightly calked and secured it will be sufficient.

It sometimes happens, that a stratum of soft matter, lying betwixt two hard solid ones, produces so large a quantity of water as greatly to incommode the operations. In such a case, a frame-work of plank, strengthened with cribs and closely calked, will stop back the whole or the greatest part of it, provided the two strata which include it are of a close texture: or let an excavation of about two feet be made in the soft stratum, quite round the circumference of the pit; and let that be filled close up betwixt the two hard strata, with pieces of dry fir-timber about 10 inches square inserted endwise, and afterwards as many wooden wedges driven in to them as they can be made to receive; if this be well finished, little or no water will find a passage through it.

It rarely happens that any suffocating damp or foul air is met with in an engine-pit, the falling of water and the working of the pumps, generally causing a sufficient circulation of fresh air; but that kind of combustible vapour or inflammable air, which will catch fire at a candle, is often met with; it proceeds from the partings, backs, and cutters, of the solid strata, exhaling from some in an insensible manner, whilst from others it blows with as great impetuosity as a pair of bellows. When this inflammable air is permitted to accumulate, it becomes dangerous by taking fire, and burning or destroying the workmen, and sometimes by its explosion will blow the timber out of the pit, and do considerable damage. If a considerable supply of fresh air is forced down the pit by air-boxes and a ventilator, or by dividing the pit into two by a close partition of deals from top to bottom, or by any other means, it will be driven out, or so weakened, that it will be of no dangerous consequence; or when the inflammable air is very strong, it may be safely carried off by making a close sheathing or lining of thin deals quite round the circumference of the pit, from the top of the solid strata to the bottom, and lengthening it as the pit is sunk, leaving a small vacancy behind the sheathing; when the combustible matter, which exhales from the strata, being confined behind these deals, may be vented by one or two small leaden pipes, carried from the sheathing to the surface; so that very little of it can transpire into the area of the pit. If a candle be applied to the orifice of the pipe at the surface, the inflammable air will instantly take fire, and continue burning like an oil lamp until it be extinguished by some external cause. Upon the whole, every method should be used to make the pit as strong in every part, and to keep it as dry as possible; and whenever any accident happens, it should be as expeditiously and thoroughly repaired as possible, before any other operation be proceeded in, lest an additional one follow, which would more than double the difficulty of repairing it.

The first operations, after sinking the engine-pit, are the working or driving a mine in the coal, and sinking the first coal-pit. The situation of the first coal-pit should be a little to the rise of the engine-pit, that the water which collects there may not obstruct the working of the coals every time the engine stops: and it should not exceed the distance of 20, 30, or 40 yards; because when the first mine has to be driven a long way, it becomes both difficult and expensive. If

there be not a sufficient circulation of fresh air in the mine, it may be supplied by the before described air-boxes and a ventilator, until it arrive below the intended coal-pit, when the pit may be bored and sunk to the coal, in the manner before mentioned.

After the pit is thus got down to the coal, the next consideration should be of the best method of working it. The most general practice in Scotland is to excavate and take away a part only of the stratum of coal in the first working of the pit, leaving the other part as pillars for supporting the roof; and after the coal is wrought in this manner to such a distance from the pit as intended, then these pillars, or so many of them as can be got, are taken out by a second working, and the roof and other solid strata above permitted to fall down and fill up the excavation. The quantity of coal wrought away, and the size of the pillars left in the first working, is proportioned to the hardness and strength of the coal and other strata adjacent, compared with the incumbent weight of the superior strata.

The same mode of working is pursued in most parts of England, differing only as the circumstances of the coalery may require: for the English coal, particularly in the northern counties, being of a fine tender texture, and of the close-burning kind, and also the roof and pavement of the coal in general not so strong as in Scotland, they are obliged to leave a larger proportion of coal in the pillars for supporting the roof, during the first time of working; and, in the second working, as many of these pillars are wrought away as can be got with safety.

The Scots coal in general being very hard, and of the open-burning kind, it is necessary to work it in such a manner as to produce as many great coals as possible, which is best effected by taking away as high a proportion of the coal as circumstances will allow in the first working; on the contrary, the English coal being very tender cannot possibly be wrought large, nor is it of much importance how small they are, being of so rich a quality; so that a larger proportion may be left in pillars in this coal than could with propriety be done in the other; and, when all circumstances are considered, each method seems well adapted to the different purposes intended.

The ancient method of working was, to work away as much of the coal as could be got with safety at one working only; by which means the pillars were left so small as to be crushed by the weight of the superior strata, and entirely lost. As great quantities of coals were lost by this method, it is now generally exploded, and the former adopted in its place; by which a much larger quantity of coal is obtained from the same extent of ground, and at a much less expence in the end.

The exact proportion of coal proper to be wrought away, and to be left in pillars at the first working, may be judged of by a comparison of the circumstances before mentioned. If the roof and pavement are both strong, as well as the coal and the pit about 30 fathoms deep, then two-thirds, or probably three-fourths, may be taken away at the first working, and one-third or one-fourth left in pillars. If both roof and pavement be soft or tender, then a larger proportion

portion must be left in pillars, probably one-third or near one-half; and in all cases the hardness or strength of the coal must be considered. If tender, it will require a larger pillar than hard coal; because, by being exposed to the air after the first working, a part of it will moulder and fall off, by which it will lose much of its solidity and resistance.

The proportion to be wrought away and left in pillars being determined, the next proper step is to fix upon such dimensions of the pillars to be left, and of the excavations from which the coal is to be taken away, as may produce that proportion. In order to form a just idea of which, see a plan of part of a pit's workings (fig. 6.) supposed to be at the depth of 30 fathoms, and the coal having a moderate rise. *A*, represents the engine-pit; *B*, the coal-pit; *A a B*, the mine from the former to the latter; *B C*, the first working or excavation made from the coal-pit, commonly called the *winning mine* or *winning headway*, nine feet wide; *b b b b*, &c. the workings called *rooms*, turned off at right angles from the others, of the width of 12 feet; *c c c c*, &c. the workings called *thirlings* or *thirlings*, 9 feet wide, wrought through at right angles from one room to another; *d d d*, &c. the pillars of coal left at the first working for supporting the roof, 18 feet long and 12 feet broad; *D D*, two large pillars of coal near the pit bottom, 15 or 20 yards long, and 10 or 15 broad, to support the pit and prevent its being damaged by the roof falling in; *e e*, the level mine wrought in the coal from the engine-pit bottom, 4 or 5 feet wide; *f f*, &c. large pillars of coal left next the level, to secure it from any damage by the roof falling in; *g g*, a dike which depresseth the coal, 1 fathom; *h h*, &c. large pillars and barriers of coal left unwrought, adjoining to the dike where the roof is tender, to prevent its falling down. The coal taken out by the first working in this pit is supposed to be one-third of the whole: and allowing the rooms 12 feet wide, and the thirlings 9 feet wide, then the pillars will require to be 12 feet wide and 18 feet long; for if one pillar be in a certain proportion to its adjoining room and thirling, the whole number of pillars will be in the same proportion to the whole number of rooms and thirlings in the pit. Suppose *A B C D*, (fig. 7.) to be a pillar of coal 18 feet long and 12 feet broad, its area will be 216 square feet; *A C H E*, the adjoining thirling, 12 feet by 9 feet, and its area 108 square feet; *B A E F G*, the adjoining room, 27 feet long and 12 feet broad, and its area 324 square feet; which added to 108 gives 432 square feet, or two-thirds wrought, and 216 square feet left, or one-third of the whole area *F G H D*.

It is proper to observe, that in the prosecution of the workings, the rooms to the right of the winning headway should be opposite to the pillars on the left; and the first, third and fifth pillar, or the second, fourth and sixth, adjoining to the said headway, should be of such a length as to overlay the adjoining thirlings; as, in the plan, the pillar 2 overlays the thirlings 1 and 3; and the pillar 4, overlays the thirlings 3 and 5; this will effectually support the roof of the main road *B C*, and will bring the other pillars into their regular order, by which means each pillar will be opposite to two thirlings. Also a larger pro-

portion of coal than common should be left in all places which are intended to be kept open after the second working; such as the pit-bottoms, air-courses, roads, and water-courses, or where the roof is tender, as it generally is near dikes, hitches, and troubles; and if the roof should continue tender for a considerable space, it will perhaps be found proper to leave a few inches of coal adhering to the roof, which, together with a few props of timber fixed under it, may support it effectually for a long time. The level mine *e e*, and the winning headway *B C*, should be wrought forward a considerable length before the other rooms, in order to be drove through any dikes that might interpose; otherwise the progress of the workings might probably be stopped a considerable time, waiting until a course of new rooms were procured on the other side of the dike. Suppose the dike *g g*, fig. 6, to depress the coal six feet or one fathom, and that it rises in the same manner on the under side of the dike as it does on the upper side; in such a case the only remedy would be to work or drive a level mine through the strata of stone from the engine-level at *e*, over the dike, until it intersect the coal at *i*; and from thence to drive a new level mine in the coal at *i i*, and a new winning headway *i k*. In order to gain a new set of rooms, and to supply fresh air to this new operation, a small mine might be drove from the room *b*, and a hole sunk down upon the level room *i i*; therefore, if the level mine *e e* was not drove so far forward as to have all these operations completed before the rooms and other workings were intercepted by the dike, the working of the pit might cease until these new places were ready.

If there be two or three strata or seams of coal in the same pit (as there often are) having only a stratum of a few feet thick lying betwixt them, it is then material to observe, that every pillar in the second seam be placed immediately below one in the first, and every pillar in the third seam below one in the second; and in such a situation the upper stratum of coal ought to be first wrought, or else all the three together: for it would be unsafe to work the lower one first, lest the roof should break, and damage those lying above.

It sometimes becomes necessary to work the coal lying to the dip of the engine or the level, which coal is consequently drowned with water, and must therefore be drained by some means before it can be wrought. If the quantity of water proceeding from it be inconsiderable, it may then be drained by small pumps laid upon the pavement of the coal, and wrought by men or horses, to raise the water up to the level of the engine-pit bottom: or if the feeders of water be more considerable, and the situation be suitable, the working road of these pumps might be connected with those in the engine-pit; by which means the water would be raised up to the level: but if the quantity of water be very great; or if, from other circumstances, these methods may not be applicable; then the engine-pit may be sunk as deep below the coal as may be necessary, and a level stone mine drove from its bottom to the dip of the strata, until it intersect the stratum of coal, from whence a new level mine might be worked, which would effectually drain it. Sup-

Coalery.

pose A B, fig. 8. to be a section of the engine-pit; B C, the coal drained by the engine; B D, the coal to the dip of the engine intended to be drained; then if the engine-pit be sunk deeper to E, a stone mine may be wrought in the direction E D, until it intersect the coal at D, by which the water will have a free passage to the engine, and the coal will be drained.

If there be another stratum of coal lying at such a depth below the first as the engine-pit is intended to be sunk to, the upper seam may in some situations be conveniently drained, by driving a mine in the lower seam of coal from E to F, and another in the upper one from B to D; and by boring a hole from D to F, the water will descend to F, and, filling the mine E F, rise up to the engine-pit bottom at E, which is upon a level with D.

Whenever it is judged necessary to work the pillars, regard must be had to the nature of the roof. If the roof is tender, a narrow room may be wrought through the pillar from one end to the other, leaving only a shell of coal on each side for supporting the roof the time of working. Suppose A B C D, fig. 7. to be a pillar of coal 18 feet long, and 12 feet broad; if the roof is not strong, the room 1, 2, 3, 4, of eight feet wide may be wrought up through that pillar, leaving a shell of two feet thick on each side; and if it can be safely done, a part of these shells may also be wrought away, by working two places through them as at 5 and 6. By this means very little of the coal will be lost; for two-thirds of the whole being obtained by the first working, and above two-thirds of the pillar by the second working, the loss upon the whole would not exceed one-tenth; but it may be observed, that some pillars will not produce so great a proportion, and perhaps others cannot be wrought at all; so that upon the whole there may be about one-eighth, one-seventh, or in some situations one-sixth part of the coal lost. If the roof be hard and strong, then as much coal may be wrought off each side and each end of the pillar as can be done with safety, leaving only a small piece standing in the middle; and when the roof is very strong, sometimes several pillars may be taken entirely out, without any loss of coal: and in general this last method is attended with less loss, and produces larger coals, than the former. In all cases it is proper to begin working those pillars first, which lie farthest from the pit bottom, and to proceed working them regularly away towards the pit; but if there be a great number of pillars to the dip of the pit, it is the safest method to work these out before those to the rise of the pit are begun with.

There is no great difference in the weight of different kinds of coals, the lightest being about 74 pounds avoirdupois, and the heaviest about 79 pounds the cubic foot; but the most usual weight is 75 pounds the foot, which is 18 hundred weight, and 9 pound the cubic yard. The statute chaldron is 53 hundred weight; or when measured is as follows, 268.8 cubic inches to the Winchester gallon; 4½ gallons to the coal peck, about 3 pounds weight; 8 coal pecks to the boll, about 247½ pounds; and 24 bolls to the chaldron, of 53 hundred weight. If one coal measuring exactly a cubic yard (nearly equal to 5 bolls) be broke into pieces of a moderate size, it will measure seven coal-bolls and a half.

If broke very small, it will measure 9 bolls; which shews that the proportion of the weight to the measure, depends upon the size of the coals: therefore accounting by weight, is the most rational method.

Coalery.

A TABLE of the weight and quantity of coal contained in one acre Scots measure, allowing one sixth part to be lost below ground, in seams of the following thicknesses.

Thickness of coal.	Weight in tons.	Quantity in chaldrons.
Feet. Inches.		
2 0	3068	1158
2 6	3835	1447
3 0	4602	1736
3 6	5369	2025
4 0	6136	2314
4 6	6903	2603
5 0	7670	2892
5 6	8437	3181
6 0	9204	3470

We shall next mention some of the various methods of bringing the coals from the rooms and other workings to the pit bottom. Where the stratum of coal is of a sufficient thickness, and has a moderate rise and dip, the coals are most advantageously brought out by horses, who draw out the coals in a tub or basket placed upon a sledge: a horse by this means will bring out from four to eight hundred weight of coals at once, according to the quantity of the ascent or descent. In some coaleries they have access to the workings by a mine made for them, sloping down from the surface of the earth to the coal; and where that convenience is wanting, they are bound into a net, and lowered down the pit. If the coal be not of such a height as to admit horses, and has a moderate rise like the last, then men are employed to bring out the coals: they usually draw a basket of four or five hundred weight of coals, fixed upon a small four-wheeled carriage. There are some situations in which neither horses nor men can be properly used; particularly where the coal has a great degree of descent, or where many dikes occur: in such a case the coals are best brought out by women called *bearers*, who carry them in a kind of basket upon their backs, usually a hundred or a hundred weight and a half at once.

When the coals are brought to the pit bottom, the baskets are then hooked on to a chain, and drawn up the pit by a rope to the surface, which is best effected by a machine called a *gin*, wrought by horses. There are other kinds of gins for drawing coals, some wrought by water, others by the vibrating lever of a fire-engine; but either of these last is only convenient in some particular situations, those wrought by horses being in most general use. After the coals are got to the surface, they are drawn a small distance from the pit, and laid in separate heaps: the largest coals in one heap, the smaller pieces called *chews* in another, and the *cullm* or *pan-coal* in a separate place.

There is an accident of a very dangerous nature to which all coaleries are liable, and which has been the ruin of several: it is called a *crush*, or a *sift*. When the pillars of coal are left so small as to fall, or yield under the weight of the superior strata; or when the

15
Of crushes
and sifts.

payment

Coalery.

Coalery.

pavement of the coal is so soft as to permit the pillars to sink into it, which sometimes happens by the great weight that lies upon them; in either case the solid stratum above the coal breaks and falls in, crushes the pillars to pieces, and clofeth up a great extent of the workings, or probably the whole coalery. As such an accident seldom comes on suddenly, if it be perceived in the beginning, it may sometimes be flopped by building large pillars of stone amongst the coal pillars: but if it has already made some progress, then the best method is to work away as many of the coal pillars adjoining to the crush as may be sufficient to let the roof fall freely down; and if it makes a breach of the solid strata from the coal up to the surface, it will very probably prevent the crush from proceeding any farther in that part of the coalery. If the crush begins in the rise part of the coalery, it is more difficult to stop it from proceeding to the dip, than it is to stop it from going to the rise when it begins in a contrary part.

Foul air.

Another circumstance proper to be taken notice of is the foul or adulterated air so often troublesome in coaleries. Of this there are two kinds: the black damp or styth, which is of a suffocating nature; and the inflammable or combustible damp. Without staying to inquire, in this place, into the origin and effects of these damp, it may be sufficient to observe, that, in whatever part of any coalery a constant supply or a circulation of fresh air is wanting, there some of these damp exist, accumulate in a body, and become noxious or fatal: and wherever there is a good circulation of fresh air, they cannot accumulate, being mixed with and carried away by the stream of air as fast as they generate or exhale from the strata. Upon these principles are founded the several methods of ventilating a coalery. Suppose the workings of the pits A and B (fig. 6.) to be obnoxious to the inflammable damp; if the communication was open betwixt the two pits, the air which went down the pit A, would proceed immediately along the mine *a*, and ascend out of the pit B; for it naturally takes the nearest direction: so that the air in all the workings would be stagnant; and they would be utterly inaccessible from the accumulation of the combustible damp. In order to expel this, the air must be made to circulate through all the different rooms, by means of collateral air-courses made in this manner: The passage or mine *a* must be closed up or stopped by a partition of deals, or by a wall built with bricks or stones, to prevent the air passing that way. This building is called a *stopping*. There must also be stoppings made in the thirlings 1 1 1, &c. betwixt the pillars *ff*, &c. which will direct the air up the mine *e*, until it arrive at the innermost thirling 2, which is to be left open for its passage. There must also be stoppings made at the side of the mine *a* at *mm*, and on both sides of the main headway BC at *bb*, &c. then returning to the innermost thirling 2, proceed to the third row of pillars, and build up the thirlings 2 2, &c. leaving open the thirling 3 for a passage for the air; and proceeding on to the fifth row of pillars, build up in the same manner the stoppings 3 3, &c. leaving open 4 for an air course: and by proceeding in this manner to stop up the thirlings or passages in every other row of pillars, the current of fresh air will circulate through and ventilate

the whole workings, in the direction pointed to by the small arrows in the plan, clearing away all the damp and noxious vapours that may generate. When it is arrived at C, it is conducted across the main headway, and carried through the other part of the pit's workings in the same manner, until it return through *nn* to the pit B, where it ascends; and as the rooms advance farther, other stoppings are regularly made.

In some of those stoppings, on the sides of the main headway, there must be doors to admit a passage for the bringing out of the coals from the rooms to the pit, as at 5 5; these doors must be constantly shut, except at the time of passing through them.

There are other methods of disposing the stoppings so as to ventilate the pit; but none which will so effectually disperse the damp as that described above. If the damp are not very abundant, then the course of stoppings 1 1 1, &c. in the level mine, and the others at *bb*, &c. in the main-headway, without any others, may perhaps be sufficient to keep the pit clear. If at any time the circulation of the fresh air is not brisk enough, then a large lamp of fire may be placed at the bottom of the pit B, which, by rarefying the air there, will make a quicker circulation.

Most of the larger coaleries send their coals to the ships for the coaling trade or exportation; and, as the quantity is generally very large, it would take a greater number of carts than could conveniently be obtained at all times to carry them; besides the considerable expence of that manner of carriage: they therefore generally use waggons, for carrying them along waggon-ways, laid with timber, by which means one horse will draw from two to three tons at a time, when in a cart not above half a ton could be drawn.

The first thing to be done in making a waggon-way is to level the ground in such a manner as to take off all sudden ascents and descents: to effect which, it is sometimes necessary to cut through hills, and to raise an embankment to carry the road through hollows. The road should be formed about 12 feet wide; and no part should have a greater descent than of one yard perpendicular in 10 of a horizontal line, nor a greater ascent than one yard in 30. After the road is formed, pieces of timber, about six feet long, and six inches diameter, called *sleepers*, are laid across it, being 18 or 24 inches distant from each other. Upon these sleepers other pieces of timber, called *rails*, of four or five inches square, are laid in a lateral direction, four feet distant from each other, for the waggon-wheels to run upon; which being firmly pinned to the sleepers, the road may then be filled with gravel, and finished.

The waggons have four wheels, either made of solid wood or of cast iron. The body of the carriage is longer and wider at the top than at the bottom; and usually has a kind of trap-door at the bottom, which, being loosed, permits the coals to run out without any trouble. The size of a waggon to carry 50 hundred weight of coals is as follows:

	Feet.	Inches.
Length of the top	7	9
Breadth of the top	5	0
Length of the bottom	5	0
Breadth of the bottom	2	6
Perpendicular height	4	3

12 C 2

Where

16
Of leading
and shipping
the coal.

Plate
LXXXI.

Where the pits are situated at some considerable distance from the harbour, it becomes necessary to have a store-house near the shipping place, where the coals may be lodged, until the lighters or ships are ready to take them in. The waggon-way should be made into the store-house, at such a height from the ground, as to permit the coals to run from the waggons down a spout into the vessels; or else to fall down into the store-house, as occasion may require.

This kind of store-house is well adapted to dispatch and saving expence: for a waggon-load of coals may be delivered either into the store-house or vessels instantly with very little trouble: and if the coals were exposed to the effects of the sun and rain, they would be greatly injured in their quality; but being lodged under cover of the store-house, they are preserved.

COALITION, the reunion of the parts of a body before separated.

COALLIER, a vessel employed to carry coals from one port to another; chiefly from the northern parts of England to the capital, and more southerly parts, as well as to foreign markets. This trade is known to be an excellent nursery for seamen; although they are often found, from the constitution of their climate, not to be so well calculated for southern navigation.

COAST, a sea-shore, or the country adjoining to the edge of the sea. Dr Campbell, in his political survey of Great Britain, considers an extensive sea-coast as of great advantage to any kingdom; and consequently that this island hath many conveniences resulting from the extent of its coasts, superior to other kingdoms which are much larger. The chief advantages arising from an extensive sea-coast are, that thus there is a convenient opportunity for exportation and importation to or from all parts of the kingdom. Thus, a number of cities are formed on the coasts; by this means the internal parts are improved, &c. The extent of the sea-coasts of Arabia, he looks upon as the genuine source of wealth and splendour to the ancient inhabitants of that peninsula; the same was the instrument of the greatness of ancient Egypt, of Phenicia, &c. In short, according to him, no country or city can for any length of time be flourishing, unless it hath a considerable connection with the sea. "It is indeed true, (says he) that the wisdom and industry of man, taking hold of some peculiar circumstances, may have rendered a few inland cities and countries very fair and flourishing. In ancient history we read of Palmyra, and the district round it, becoming a luxuriant paradise in the midst of inhospitable deserts. But this was no more than temporary grandeur; and it has now lain for some ages in ruins. The city and principality of Kandahar was in like manner rendered rich and famous, in consequence of its being made the centre of the Indian commerce; but, long ago declining, its destruction has been completed, in our days, from that dreadful desolation which Thamas Kouli Khan spread through Persia and the Indies. Here, in Europe, many of the large cities in Germany, which for a time made a great figure from the freedom and industry of the inhabitants, and diffused ease, plenty, and prosperity, through the districts dependent on them, which of course rendered them populous, are now so much sunk,

through inevitable accidents, as to be but shadows of what they were; and, though they still continue to subsist, subsist only as the melancholy monuments of their own misfortunes. We may therefore, from hence, with great certainty, discern, that all the pains and labour that can be bestowed in supplying the defect of situation in this respect, proves, upon the whole, but a tedious, difficult, and precarious expedient. But, however, we must at the same time admit, that it is not barely the possession even of an extended coast that can produce all these desirable effects. That coast must likewise be distinguished by other natural advantages; such as capes and promontories, favourably disposed to break the fury of the winds; deep bays, safe roads, and convenient harbours. For, without these, an extended coast is no more than a maritime barrier against the naval force of other nations; as is the case in many parts of Europe; and is one of the principal reasons why Africa derives so little benefit from a situation which has so promising an appearance; there being many considerable tracts upon its coasts, equally void of havens and inhabitants, and which afford not the smallest encouragement to the attempting any thing that might alter their present desolate condition. It is, however, a less inconvenience, and in some cases no inconvenience at all, if, in the compass of a very extended coast, there should be some parts difficult or dangerous of access, provided they are not altogether inaccessible.—The sea-coast of Britain, from the figure, in some measure, of the island, but chiefly from the inlets of the sea, and the very irregular indented line which forms its shore, comprehends, allowing for those sinuities, at least 800 marine leagues: we may, from hence, therefore, with safety affirm, that in this respect it is superior to France, though that be a much larger country; and equal to Spain and Portugal in this circumstance, though Britain is not half the size of that noble peninsula, which is also singularly happy in this very particular."

COASTING, in navigation, the act of making a progress along the sea-coast of any country. The principal articles relating to this part of navigation are, the observing the time and direction of the tide; knowledge of the reigning winds; of the roads and havens; of the different depths of the water, and qualities of the ground.

COASTING-Pilot a pilot, who by long experience has become sufficiently acquainted with the nature of any particular coast, and of the requisites mentioned in the preceding article, to conduct a ship or fleet from one part of it to another.

COAT, or COAT of ARMS, in heraldry, a habit worn by the ancient knights over their arms both in war and tournaments, and still borne by heralds at arms. It was a kind of surcoat, reaching as low as the navel, open at the sides with short sleeves, sometimes furled with ermine and hair, upon which were applied the armories of the knights embroidered in gold and silver, and enamelled with beaten tin-coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diversified with bands and fillets of several colours, alternately placed, as we still see cloths scarleted, watered, &c. Hence they were

Fig. 1.

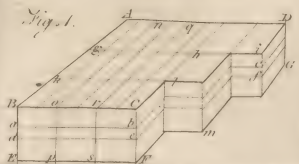


Fig. 2.



Fig. 3.

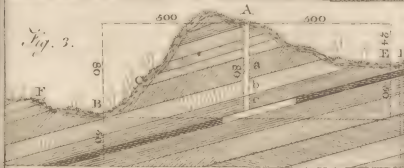


Fig. 4.

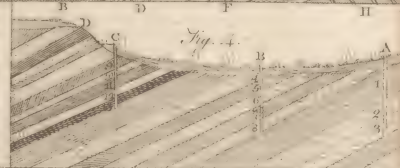


Fig. 5.

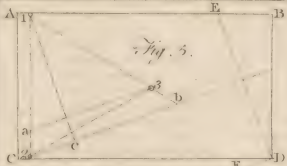


Fig. 6.

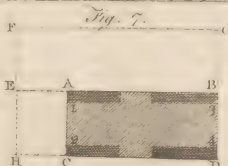
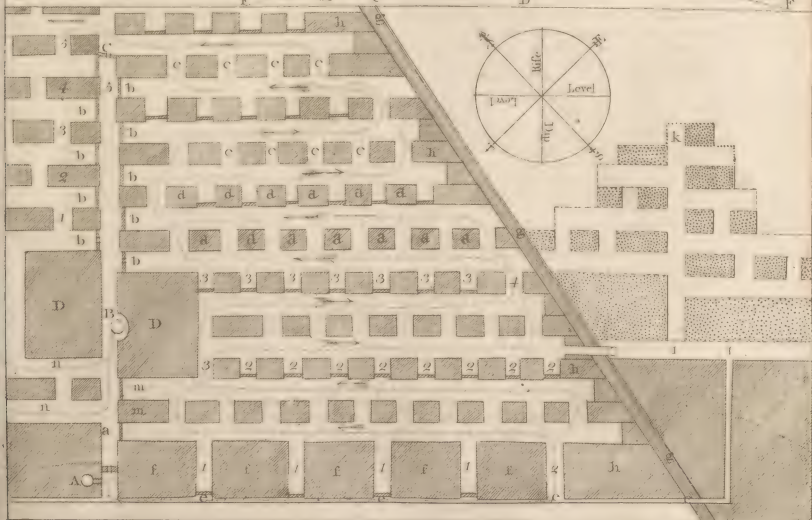
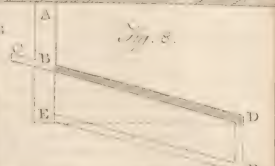


Fig. 7.





Coat
| Cobalt.

were called *devils*, as being divided and composed of several pieces sewed together; whence the words *faulx*, *pale*, *chevron*, *bend*, *croisi*, *salzier*, *lozenge*, &c. which have since become honourable pieces, or ordinaries of the shield. See *CROSS*, *BEND*, *CHEVRON*, &c.

Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

COAT, in anatomy. See *TUNIC*.

COAT of Mail, a kind of armour made in form of a shirt; consisting of iron rings wove together netwise. See *MAIL*.

COATI, in zoology, a synonyme of a species of *VIPERA*, and *URSUS*.

COATIMUNDI, a variety of the above.

COATING, among Chemists. See *CHEMISTRY*, n° 81.

COATING of Vials, panes of Glass, &c. among electricians, is usually performed by covering the outside of the vial with tinfoil, brags or gold-leaf, &c. and filling its inside with loose pieces of brags-leaf, by which means it becomes capable of being charged. See *ELECTRICITY*.

COBALT, a genus of fossils of the order of the asphurclata. In its purer state it is considerably compact and heavy, and not unfrequently of a semi-metallic appearance. Its texture is always fine; sometimes granulated, or composed of minute grains ranged into small strise; sometimes smooth and even, without any distinguishable grain. Its colour is sometimes a pale iron grey; sometimes a darker bluish or blackish grey. From variations of this kind, some mineralogists have divided it into distinct species, the principal of which are these. 1. Dark-grey cobalt; compact, ponderous, and of a very fine grain. This sort is said to be the most esteemed in Saxony, and to produce the finest blue glass. 2. Bright pale-grey, or ash-coloured cobalt, of a somewhat looser structure, and less ponderous. This kind has a great resemblance to the arsenical pyrite, and some of the white silver and copper ores, from which those who are accustomed to the inspection of these minerals distinguish it pretty readily, by the colour of the cobalt being somewhat duller, and its texture finer. 3. Vitreous cobalt; in structure resembling melted scoria or glass, of a bright bluish-grey colour, called, by the Germans, *schlacken-kobolt*, slag cobalt. 4. Crystalliform cobalt, affecting chiefly a cubical figure sometimes perfect, but commonly with the angles imperfect. 5. Specular cobalt, intermixed with glittering talky flakes. 6. Earthy cobalt, blended with various earths into soft friable compounds, of a black, yellowish-grey, or other colours. 7. Flowers of cobalt. These are of a loose radiated structure, and generally not so heavy as the foregoing ores. The external parts are of a fine purplish red, a violet, or a peach-bloom colour. Sometimes the whole mass is elegantly tinged with these colours throughout; but more commonly the internal parts are of a greyish or leaden hue. They are never found in great quantities, or forming regular veins; but only in detached masses, lodged in clefts of stones; in places to which the air has had free access. They appear to proceed from a spontaneous resolution of some of the foregoing minerals; most of which

Cobalt.
| Cobbling.

are found to yield nearly similar effervescences on being exposed in heaps for a length of time to a moist air. Wherever the workmen meet with these flowers, they expect a rich vein of cobalt in the neighbourhood.

Cobalt is found most plentifully in Saxony, particularly near Schneeberg in the district of Misnia. The mines here are said to be two or three hundred fathoms deep; and the cobalt lodged at great depths to be of a better quality than such as is near the surface. The Schneeberg hill, according to the ancient chronicles of Saxony, yielded at first only an iron ore; which, on sinking deeper, about the beginning of the 14th century, was succeeded by a very rich ore of silver. This also being at length exhausted gave place to cobalt. Some pieces of the cobalt ores are still found to participate of silver, and even of gold: but these metals, far from being essential, as some have supposed, to all cobalts, are entirely accidental even in this. Cobalt has also been found in some parts of England, particularly in Mendip-hills in Somersetshire, and in Cornwall. Its quality, however, is found to be somewhat different from that found in Saxony. This country has long supplied all the world with zaffre and smalt, the most valuable productions from cobalt; great quantities of them being thence exported even to the East Indies. It is supposed that the Chinese, and more particularly the Japanese, had formerly mines of an excellent cobalt, from the produce of which were painted the fine blues of their ancient porcelains; but that these mines are now exhausted, and that the inferior blues of their present ware are painted with the Saxon zaffre imported to them by the Dutch.

Cobalt contains a great quantity of arsenic, and it is from this mineral that most of the arsenic we have is prepared. The greatest quantities are made at Geyerberg in Misnia, from cobalt and other arsenical ores brought from Schneeberg. The ore is thrown into a furnace resembling a baking oven; whose flue is an horizontal pipe near 100 fathoms in length, considerably wide at the end which communicates with the furnace, and growing gradually narrower to the other end. The ore is every now and then stirred and turned in the furnace to promote the extrication of the arsenic, which arises in fumes into the pipe, and there condenses into a greyish or blackish powder called *meal arsenic*. This is refined by a second sublimation in close vessels, with the addition of a little potash which detains its impurities. In this operation, the fire which elevates the arsenic, heating the receiver, the flowers melt together into the crystalline masses brought to us. From cobalt, also, are prepared the substances called *zaffre* and *smalt*, used for tinging glass of a blue colour. See *ZAFFRE* and *SMALT*.

Regulus of COBALT, a kind of semi-metal prepared from cobalt, of a whitish colour inclining to red. For the manner of its preparation, see *ZAFFRE*. For its chemical properties, see *CHEMISTRY*, n° 159, 212, 213, 259.

COBBING, a punishment sometimes inflicted at sea. It is performed by striking the offender a certain number of times on the breech with a flat piece of wood

Cobitis
Coccinella.

wood called the *robbing-board*. It is chiefly used as a punishment to those who quit their station during the period of the night-watch.

COBITIS, the *LOACHE*, in ichthyology, a genus of fishes belonging to the order of abdominales. The eyes are in the upper part of the head. The branchiostegic membrane has from four to five rays; and the body is nearly of an equal thickness throughout. The species are five; three of which are natives of Europe. The loache is found in several of our small rivers, keeping at the bottom on the gravel; and is, on that account, in some places called the *groundling*: It is frequent in the stream near Amesbury in Wiltshire, where the sportsmen, thro' frolic, swallow it down alive in a glass of white-wine.

COBLENTZ, an ancient, handsome, and strong town of Germany, in the electorate of Trier or Treves, seated at the confluence of the rivers Rhine and Moselle, in a fertile country, with mountains covered with vineyards. It is the usual residence of the elector of Treves, to whom it belongs. E. Long. 7. 18. N. Lat. 50. 24.

COBOB, the name of a dish among the Moors. It is made of several pieces of mutton wrapt up in the cawl, and afterwards roasted in it; the poorer people, instead of the meat, use the heart, liver, and other parts of the entrails, and make a good dish, though not equal to the former.

COBURG, a town of Germany in the circle of Franconia, and capital of a territory of the same name, with a famous college, a fort, and a castle. This town, with its principality, belongs to the house of Saxony, and the inhabitants are Protestants. It is seated on the river Itz, in E. Long. 11. 5. N. Lat. 50. 20.

COBWEB, in physiology, the fine net-work which spiders spin out of their own bowels, in order to catch their prey. See *ARANEÆ*.

COCCÆIUS (John), professor of theology at Bremen, was founder of a sect called *Cocceians*: they held, amongst other singular opinions, that of a visible reign of Christ in this world, after a general conversion of the Jews and all other people to the true Christian faith, as laid down in the voluminous works of Cocceius. He died in 1699, aged 66.

COCCIFEROUS PLANTS, the same with *bacciferous*. See *BACCIFEROUS*.

COCCINELLA, in zoology, a genus of insects, of the coleoptera order. The antennæ are fulclavated, and truncated; the polypi are shaped like a heart; the body is of a hemispherical figure; the breast and elytra are marginated; and the belly is plain. The species are forty-nine, mostly distinguishable by the number and colour of the spots on their wings, and the plants upon which they live. The *coccinella cacti*, a native of the warmer parts of America, is the famous cochineal animal, so highly valued in every part of the world for the incomparable beauty of its red colour, which it readily communicates to wool and silk, but with much more difficulty to linen and cotton. This insect, like all others, is of two sexes, but exceedingly dissimilar in their appearance. The female, which alone is valuable for its colour, is ill-shaped, tardy, and stupid: its eyes, mouth, and antennæ, are fixed so deep, and are so concealed in

the folds of the skin, that it is impossible to distinguish them without a microscope. The male is very scarce, and is sufficient for 300 females or more; it is active, small, and slender in comparison with the female; its neck is narrower than the head, and still narrower than the rest of the body. Its thorax is of an elliptic form, a little longer than the neck and head put together, and flattened below; its antennæ are jointed, and out of each joint issue long, slender hairs that are disposed in pairs on each side. It has six feet, each formed of distinct parts. From the posterior extremity of its body two large hairs or bristles are extended, that are four or five times the length of the insect. It bears two wings that are fixed to the upper part of the thorax, which falls like the wings of common flies when it walks or rests. These wings, which are of an oblong form, are suddenly diminished in breadth where they are connected to the body. They are strengthened by two oblong muscles; one of which extends itself on the outside all round the wing; and the other, which is internal and parallel to the former, seems interrupted towards the summit of the wings. The male is of a bright red; the female of a deeper colour. They are bred on a plant known in Oaxaca in New Spain, and all those parts where it abounds, by the name of *nopal*, or *no-palleca*, the *Indian fig-tree**, which, except in the difference of the foliage, resembles the tinos, so common in the kingdom of Andalusia; the leaf of the tuna being broad, flat and prickly, and that of the nopal, oblong, with several eminences; and instead of spines has a fine smooth membrane, of a permanent and lively green.

The method of planting the nopal, is by making rows of holes about half a yard deep, and about two yards distant from one another. In each of these holes is placed one or two leaves of the nopal, in a flat position, and then covered with earth. This leaf soon after shoots up into a single stem, which during its growth divides into several branches, and these successively produce fresh leaves, the largest being nearest to the stem, which is full of knots, as are also the branches, and from these the leaves have their origin. The usual height of this plant is about three yards, which it seldom exceeds. The season when the nopal displays all its beauty and vigour, is like that of other plants, from the spring to the autumn, which at Oaxaca and other parts of North America is at the same time as in Spain. Its blossom is small, of a bright red, and in the shape of a bud; from the centre of which proceeds the tuna, a name given to its fruit; and as this increases the blossom fades, till at length it falls. When the tuna, or fig, is ripe, the outward skin becomes white; but the pulp is so fully impregnated with a deep red, that it tinges the urine of those who eat it of a blood colour, a circumstance attended with no small uneasiness to those who are unacquainted with this particular. Few fruits, however, are either more wholesome or pleasant.

The ground where the nopal is intended to be planted, must be carefully cleaned from all kinds of weeds, as they drain the soil of those juices which the nopal requires. Also after the cochineal is taken from the plant, which is never done till the insects are arrived

Coccinella.

* A species of *Opuntia*.

at perfection, all the superfluous leaves are plucked off, that they may be succeeded by others the following year. For it must be observed, that the cochineal which are bred on young plants thrive much better, and are of a finer quality, than those produced on such as have stood some years.

The cochineal was formerly imagined to be a fruit or seed of some particular plant; an error which probably arose from an ignorance of the manner in which it is propagated; but at present every one is convinced of its being an insect, agreeably to its name, signifying a wood-louse, which generally breeds in damp places, especially in gardens. These insects, by rolling themselves up, form a little ball something less than a pea; and in some places are known by the name of *baguillas de San Anton*, i. e. St Anthony's little cows: and such is the figure of the cochineal, except that it has not the faculty of rolling itself up; and its magnitude, when at its full growth, does not exceed that of a tick, common in dogs and other animals.

These insects breed and are nourished on the nopals, where their eggs are placed among the leaves; the juice of the plant, which is their sole nourishment, becomes converted into their substance; when, instead of being thin and watery, and, to all outward appearance, of little or no use, is rendered a most beautiful crimson colour. The plant is in May or June in its most vigorous state, and at this most favourable season the eggs are deposited; and in the short space of two months, from an animalcule, the insect grows up to the size above mentioned: but its infant state is exposed to a variety of dangers; the violent blasts of the north wind sweep away the eggs from the foliage of the plant; and, what is equally fatal to their tender constitutions, showers, fogs, and frosts, often attack them, and destroy the leaves, leaving the careful cultivator this only resource, namely, that of making fires at certain distances, and filling the air with smoke, which frequently preserves them from the fatal effects of the inclemency of the weather.

The breeding of cochineal is also greatly obstructed by birds of different kinds, which are very fond of these insects; and the same danger is to be apprehended from the worms, &c. which are found among the plantations of nopals: so that unless constant care be taken to fright the birds away from the plantation, and to clear the ground of those various kinds of vermin, which multiply so fast in it, the owner will be greatly disappointed in his expectations.

When the insects are at their full growth, they are gathered and put into pots of earthen ware; but much attention is requisite to prevent them from getting out, as, in that case, great numbers of them would be lost; though there is no danger of it, where they are at liberty on the nopal leaves, those being their natural habitation, and where they enjoy a plenty of delicious food: for, though they often remove from one leaf to another, they never quit the plant; nor is it uncommon to see the leaves entirely covered with them, especially when they are arrived at maturity. When they have been confined some time in these pots, they are killed and put in bags. The Indians have three different methods of killing these insects,

one by hot water, another by fire, and a third by the rays of the sun: and to these are owing the several gradations of the colour, which in some is dark, and in others bright; but all require a certain degree of heat. Those therefore who use hot water are very careful to give it the requisite heat, and that the quantity of water be proportioned to the number of insects. The method of killing the creatures by fire is to put them on shovels into an oven moderately heated for that intention; the fine quality of the cochineal depending on its not being over dried at the time of killing the insects: and it must be owned, that among the several ways made use of to destroy this valuable creature, that of the rays of the sun seems to bid fairest for performing it in the most perfect manner.

Besides the precaution requisite in killing the cochineal, in order to preserve its quality, it is equally necessary to know when it is in a proper state for being removed from the leaves of the nopal; but as experience only can teach the cultivator this necessary criterion, no fixed rule can be laid down. Accordingly, in those provinces where the cultivation of these insects is chiefly carried on, those gathered by Indians of one village differ from those gathered in another; and even those gathered by one person in the same village, are often different from those gathered by another; every individual adhering to his own method.

The cochineal-insect may, in some circumstances, be compared to the silk-worm, particularly in the manner of depositing its eggs. The insects destined for this purpose are taken at a proper time of their growth, and put into a box well closed, and lined with a coarse cloth that none of them be lost: and in this confinement they lay their eggs and die. The box is kept close shut till the time of placing the eggs on the nopal, when, if any motion is perceived, it is a sufficient indication that the animalcule has life, though the egg is so minute as hardly to be perceived; and this is the seed placed on the foliage of the nopal, and the quantity contained in the shell of a hen's egg is sufficient for covering a whole plant. It is remarkable that this insect does not, or at least in any visible manner, injure the plant, but extracts its nourishment from the most succulent juice, which it sucks by means of its proboscis through the fine teguments of the leaves.

The principal countries where the cochineal insects are bred, are Oaxaca, Plasfala, Chulula, Nueva Galicia, and Chiapa, in the kingdom of New Spain; and Hambato, Loja, and Tucuman in Peru: but it is only in Oaxaca, that they are gathered in large quantities, and form a branch of commerce, the cultivation of these little creatures being there the chief employment of the Indians.

Though the cochineal belongs to the animal kingdom, of all others the most liable to corruption, yet it never spoils. Without any other care than merely that of keeping in a box, it has been preserved for ages. In drying, it loses about two-thirds of its weight. When dried, it is sorted into large entire grains, and small or broken ones: the first are called by the Spaniards *grana*, the latter *graniilla*. In trade, four sorts are distinguished, *Meslique*, *Campechane*, *Tetraschale*, and

Cocco-
thraustes
||
Coccus.

and *syzygster*; of which, the first is accounted the best, and the last the worst. The three first are named from the places where they are produced; the latter from its being found wild without any culture. In medicine, cochineal has been strongly recommended as a sudorific, cardiac, and alexipharmac; but practitioners have never observed any considerable effects from it. Its principal consumption is among dyers. See the article DYEING.

COCOTHRUAUTES, in ornithology, the trivial name of a species of LOXIA.

COCULUS INDICUS, the name of a poisonous berry, too frequently mixed with malt-liquors, in order to make them intoxicating; but this practice is expressly forbid by act of parliament. It is the fruit of the *menispermum cocculus*. Fishermen have a way of mixing it with paste: this the fish swallow greedily, and are thereby rendered lifeless for a time, and float on the water. The good women use it with stavesacre, for destroying vermin in childrens heads.

COCCUS, in zoology, a genus belonging to the order of hemiptera. The rostrum proceeds from the breast; the belly is bristly behind; the wings of the male are erect; and the female has no wings. The species are 22, denominated principally from the plants they frequent.

Coccus Maldivia, the Maldivia nut, in the materia medica; the name of the fruit of the *palma Maldivensis* of Johnston; an oval-shaped fruit of a sweet taste, and famous for its virtues in nervous disorders.

Coccus Polonicus, an insect which may properly enough be called the *cochineal* of the northern part of the world. As the cochineal loves only the hot climates, this creature affects only the cold ones. It is collected for the use of dyers: but the crops of it are much smaller, more difficultly made, and the drug itself greatly inferior to the true cochineal. It is commonly known by the name of *coccus Polonicus*, or the *scarlet grain of Poland*. That country is indeed the place where it is gathered in the greatest abundance; but it is not the only one where it is found. It is to be met with in many of the northern countries; and possibly may be found in some of the more temperate ones, where it is not yet known; as it is very much hid by nature from the eyes of common observers. It is found affixed to the root of a plant, and usually to plants of that species, from thence called *polygonum cocciferum*: though authors have informed us of the *fame berry*, as it is often called, being found at the roots of the mouse-ear, rupture-wort, pimpinell, and pellitory of the wall; and that it is in no other than sandy places that it is found at the roots of those plants. Breynius in 1731, printed at Dantzick a very curious account of this production, which proves it uncontestedly to be an animal. Towards the end of June the coccus is in a fit state for being gathered. Every one of the creatures is then nearly of a spherical form, and of a fine violet colour. Some of them, however, are not larger than poppy seeds, and others of the size of a pepper-corn; and each of them is lodged, either in part or entirely, in a sort of cup like that of an acorn. More than half the surface of the body of the animal is covered by this cup. The outside of the covering is rough, and of a blackish brown; but the inside is

smooth, polished, and shining. On some plants they find only one or two of these, and on others more than forty; and they are sometimes placed near the origin of the stalks of the plants.

Breynius began his observations on the animals in this state, several of them being put into vessels of glass; and by the 24th of July, there was produced from every one of them a hexapod, or six-legged worm, with two antennæ on its head. Several of these were kept a fortnight, and shewed no inclination to eat any thing. They run about, however, very swiftly for some time; but then began to be more quiet, drew up their bodies shorter, and ceased to run about any longer. They were now in a purple colour; but in this state, though they did not walk about, they were subject to various contortions. At length, when they were become wholly motionless, their bodies became covered with a fine down; this was white, and formed them a perfect covering, which was sometimes of a spherical, and sometimes of an irregular figure: it was always, however, very elegant; and the downy matter plainly enough transpired out of the animal's body. The creatures remained in this state of rest, and covered with this down, for five or six days; but at the end of that time every one of them laid more than 150 eggs. These eggs were deposited upon the paper on which the animals were placed, and were enveloped in some measure by a downy matter. When the creatures had laid all their eggs they died; and about the 24th of August there came from every egg a small insect, which to the eye scarce seemed any other than a red point; it might, however, be observed very plainly to move about. These young animals lived about a month, wholly without sustenance. Mr Breynius was induced at first to believe, that these animals came to be in a state to produce perfect eggs, without any congress with the male; but farther observations convinced him of the error of this opinion. He saw afterwards a sort of very small flies with two white wings bordered with red, produced from several of the cocci. These flies are plainly of the same kind with the male gall-insects.

It has before been observed, that these cocci differ in size. The flies are produced by the small ones not bigger than a poppy seed; the others give the worms before described: and one observation of Mr Breynius's gives a plain proof that these flies are the male insects of the species; since all those of the females, which had been a day or two accompanied by those flies, quickly covered themselves with down and began to lay their eggs; whereas those which had not this commerce with the flies remained in the same state, or else got only a very thin and slight covering of down, and never laid any eggs. The manner of this creature's life, however, from its being hatched, to its being found in the shape of a berry at the roots of the plants, is yet unknown: and how they assume the shape of a ball lodged in a cup, must require a nice observation to discover.

COCCYGÆUS MUSCULUS. See ANATOMY, *Table of the musciles*.

COCCYX, or COCCYGIS OS. See ANATOMY, n°34.
COCHIN, a town of Asia, in the kingdom of the same name, on the Malabar coast. The Dutch have here

Coccus
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Cochin.

here a small fort named Cranganore, which lies about three miles up the river. Formerly it bore the name of a kingdom; and was once a republic of Jews, who at that time could reckon 80,000 families, but are now reduced to 4000. They have a synagogue at Cochin near the king's palace, in which are preserved their records, engraven on copper-plates in the Hebrew characters; and when any of the characters decay, they have them fresh cut. They declare themselves to be of the tribe of Manasséh, a part whereof was by Nebuchadnezzar carried to the most eastern province of his dominions, which, according to them, extended as far as Cape Comorin: and this journey 20,000 of them performed in three years after their setting out from Babylon. When they arrived in Malabar, they were received with great civility by the inhabitants, who allowed them liberty of conscience, and the use of their own customs. There, having increased in number and riches, they at length purchased the little kingdom of Kranganor, and chose two sons of an eminent family to govern the common-wealth, and reign jointly over them. But one of the brothers having killed the other, the son revenged his father's death by that of the murderer; upon which the state fell again into democracy, and still continues. The lands have long reverted into the hands of the Malabars, and many of the Jews through poverty have embraced the Hindoo religion.

COCHIN-CHINA, a kingdom of Asia, bounded on the north by Tonquin; on the east, by the sea of China; on the south, by the Indian ocean; and on the west, by Cambodia, and a ridge of mountains inhabited by a savage people called *Kemois*, who live independent of any government. Little of the history of this kingdom is known; what follows depends entirely on the credit of M. le Poivre, a French traveller.—About half a century before the French first arrived in these distant regions, a prince of Tonquin, as he fled from his sovereign, by whom he was pursued as a rebel, had, with his soldiers and adherents crossed the river, which serves as a barrier between Tonquin and Cochin-China. The fugitives who were warlike and civilized men, soon expelled the scattered inhabitants, who wandered about without any society or form of government, and founded a new kingdom, which soon grew rich and populous. During the reigns of the first six kings, no nation could be happier than the Cochin-Chinefe. Their monarchs governed them as a father does his family, establishing no laws but those of nature, to which they themselves were the first to pay obedience. They honoured and encouraged agriculture, as the most useful employment of mankind; and required from their subjects only a small annual free-gift to defray the expence of their defensive war against the Tonquinefe, who were their enemies. This imposition was regulated by way of poll-tax, with the greatest equity. Every man, able to till the ground, paid into the prince a small sum proportioned to the strength of his constitution, and the vigour of his arm: and nothing more.

Cochin-China continued happy under these princes for more than a century; but the discovery of gold-mines put a stop to these mild regulations. Luxury

immediately took place. The prince began to despise the simple habitation of his ancestors, and caused a superb palace to be built, a league in circumference, surrounded with a wall of brick in the model of that of Pekin, and defended by 1600 pieces of cannon. Not content with this, he would needs have a winter palace, an autumn palace, and a summer palace. The old taxes were by no means sufficient to defray these expences; new ones were devised; and oppression and tyranny every where took place. His courtiers, to flatter their prince, gave him the title of the *king of Heaven*, which he still continues to assume. When speaking of his subjects, he styles them his *children*, but by no means behaves as if he was their father: for our author informs us, that he has seen whole villages newly abandoned by their inhabitants, who were harassed with toil and insupportable exactions; the necessary consequence of which was, that their lands returned to their former uncultivated state.

M. le Poivre represents the Cochin-Chinefe as gentle, hospitable, frugal, and industrious. There is not a beggar in the country; and robbery and murder are absolutely unknown. A stranger may wander over the kingdom from one end to the other, (the capital excepted), without meeting with the slightest insult. He will be every where received with the most eager curiosity, but at the same time with the greatest benevolence. A Cochin-Chinefe traveller, who has not money sufficient to defray his expences at an inn, enters the first house of the town or village he arrives at, and waiting the hour of dinner, takes part with the family, and goes away when he thinks proper, without speaking a word, or any person's putting to him a single question.

The country of Cochin-China is much of the same temperature with that of Tonquin; though rather milder, as lying nearer the sea. Like Tonquin, it is annually overflowed, and consequently fruitful in rice, which requires no other manure than the mud left by the inundations. They have sugar-canes, and the same kinds of fruits common to other parts of India. The country produces no grapes, and therefore they drink a liquor brewed from rice. They have vast woods of mulberry-trees, which run up as fast as our hemp. Their silk is stronger than that of China, but not so fine. They have the best timber in the world, particularly a sort which abounds in the mountains, and is called the *incorruptible tree*; because it never rots under earth or water, and is so solid that it serves for anchors. There are two kinds, black and red. The trees are very tall, straight, and so big that two men can scarce fathom them. They have also on the mountains of the *Kemois* a tree of the most fragrant scent, which is supposed to be the same with *lignum aloes*. This, being reckoned the best product of the country, is engrossed by the king, and is sold from five to 16 ducats per pound. It is highly valued both in China and Japan, where the logs of it are sold for 200 ducats a pound, to make pillows for the king and nobility; and among those Indians which continue to burn their dead, great quantities of it are used in the funeral piles. The young trees called *agulla*, or eagle-wood, are every one's property, which makes the old

Cochin-
China
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Cochlearia.

ones called *calamba* so scarce and dear. They have oak, and large pines, for the building of ships; so that this country is of the same use to China, that Norway is to Britain. In general, they have the same kind of trees and plants that are to be met with in Tonquin. They have mines of gold, as well as diamonds; but the last they do not value so highly as pearl. They also esteem their coral and amber very much. In all the provinces there are great granaries filled with rice, in some of which that grain is kept upwards of 30 years. One of the greatest rarities in these parts, especially in grand entertainments, is a ragout made of the eatable birds nests, which some say are found only in Cochin-China, and others in four islands that lie south of its coast. See BIRDS-NESTS.

The merchants of Cambodia, Tonquin, China, Macao, Manila, Japan and Malacca, trade to Cochin-China with plate, which they exchange for the commodities of the country. The Portuguese are the most favoured here of any Europeans. The Cochin-Chinese themselves, not being inclined to travel, seldom sail out of sight of their own shore, but purchase many trifles from foreigners at great rates, particularly combs, needles, bracelets, glass pendants, &c. They are very fond of our hats, caps, girdles, shirts, and other clothes; and, above all, set a great value on coral. The country is said to have 700 miles of coast, with many large inlets of the sea, and above 60 convenient landing places; which, however, according to Captain Hamilton, are but seldom visited by strangers.

COCHINEAL. See COCCINELLA.

COCHLEA, the shell-snail, in zoology. See HELIX.

COCHLEA, in Anatomy. See ANATOMY, n° 405.

COCHLEARIA, SCURVY-GRASS; a genus of the siliculosa order, belonging to the tetradynamia class of plants. There are six species, the most remarkable of which are, 1. The anglica, or garden scurvy-grass, grows naturally on the sea-shore, in the north of England and in Holland; but is cultivated for use in the gardens near London. It hath a fibrous root, from which arise many round succulent leaves, which are hollowed like a spoon; the stalks rise from six inches to a foot high: these are brittle, and garnished with leaves which are oblong and sinuated. The flowers are produced in clusters at the end of the branches, consisting of four small white petals which are placed in the form of a cross; and are succeeded by short, roundish, swelling, seed-vessels, having two cells divided by a thin partition. In each of these are lodged four or five roundish seeds. 2. The armoracia, or horse-radish, is so well known as to need no description.

The first is propagated by seeds, which are to be sown in July, in a moist spot of ground; and when the plants are come up they should be thinned, so as to be left at about six inches distance each way. The plants that are taken out may be transplanted into other borders. In the spring these plants will be fit for use; those that are left, will run up to seed in May, and perfect their seeds in June. If the seeds are sown in the spring they seldom grow well. The horse-radish is propagated by cuttings or buds from the sides of the old roots. The best season for this

work is in October or February; the former for dry lands, the latter for moist.

Uses. Scurvy-grass is a pungent stimulating medicine; capable of dissolving viscid juices, opening obstructions of the viscera and the more distant glands, and promoting the more fluid secretions. It is particularly celebrated in scurvy, and is the principal herb employed in these disorders in the northern countries. See MATERIA MEDICA, n° 263. Horse-radish root has a quick pungent smell, and a penetrating acrid taste; it nevertheless contains in certain vessels a sweet juice, which some times exudes on the surface. By drying it loses all its acrimony, becoming first sweetish, and then almost insipid: if kept in a cool place in sand, it retains its qualities for a considerable time. The medical effects of it are to stimulate the solids, attenuate the juices, and promote the fluid secretions: it seems to extend its action through the whole habit, and to affect the minutest glands. It has frequently done service in some kinds of scurvy and other chronic disorders proceeding from a viscosity of the juices or obstructions of the excretory ducts. Sydenham recommends it likewise in dropsies, particularly those which follow intermittent fevers. Both water and rectified spirit extract the virtues of this root by infusion, and elevate them in distillations: along with the aqueous fluid an essential oil rises, possessing the whole taste and pungency of the horse-radish.

COCHLITES, in natural history, an appellation given to the petrified shells of the cochleæ or snails.

COCK, in zoology, the English name of the males of gallinaceous birds, but more especially used for the common dunghill cock. See PHASIANUS.

Black Cock.

Cock of the Wood. } See TETRAO.

Cock-Paddle, Lump-fish, or Sea-owl. See CYCLOP-TERUS.

COCK-PIT, a sort of theatre upon which game-cocks fight.

It must appear astonishing to every reflecting mind, that a mode of diversion so cruel and inhuman as that of cock-fighting should so generally prevail, that not only the ancients, barbarians, Greeks and Romans, should have adopted it; but that a practice so savage and heathenish should be continued by Christians of all sorts, and even pursued in these better and more enlightened times.

The ancient Greeks and Romans, as is well known, were wont to call all the nations in the world Barbarians; yet certainly, if we consider the many instances of cruelty practised among them, there was very little reason for the distinction. Human sacrifices were common both to them and the barbarians; and with them the exposing of infants, the combats of men with wild beasts, and of men with men in the gladiatorial scenes, were spectacles of delight and festivity.

The islanders of Delos, it seems, were great lovers of cock-fighting; and Tanagra a city in Bœotia, the isle of Rhodes, Chalcis in Eubœa, and the country of Media, were famous for their generous and magnanimous race of chickens. The kingdom of Persia was probably included in the last, from whence this kind

Cochlearia
||
Cock.

of poultry was first brought into Greece; and if one may judge of the rest from the fowls of Rhodes and Media, the excellency of the broods at that time consisted in their weight and largeness, (as the fowls of those countries were heavy and bulky), and of the nature of what our sportsmen call shakebags or turnpokes. The Greeks, moreover, had some method of preparing the birds for battle, by feeding; as may be collected from Columella.

It should seem, that at first cock-fighting was partly a religious and partly a political institution at Athens; and was there continued for the purpose of improving the seeds of valour in the minds of their youth; but was afterwards abused and perverted both here and in the other parts of Greece to a common pastime, without any moral, political, or religious intention, and as it is now followed and practised among us.

At Rome, as the Romans were prone to imitate the Greeks, we may expect to find them following their example in this mode of diversion, and in the worst way, viz. without any good or laudable motives; since, when they took and brought it to Rome, the Greeks had forgotten every thing that was commendable in it, and had already perverted it to a low and unmeaning sport. Sigismond Hyam thinks the Romans borrowed the pastime from Dardanus in Asia; but there is little reason for making them go so far from it, when it was so generally followed in Greece, whose customs the Romans were addicted to borrow and imitate. However, it is probable, they did not adopt this opinion very early. It may be gathered from Columella, that the Romans did not use the sport in his time. This author styles cock-fighting, a *Grecian diversion*; and speaks of it in terms of ignominy, as an expensive amusement, unbecoming the frugal householder, and often attended with the ruin of the parties that followed it. The words are remarkable. "Nos enim censensus instituere vestigal industri patris familias, non rixosarum avium lanistæ, cujus plerumque totum patrimonium pignus alex, victor gallinaceus pyctes abstulit." Where he describes, as we think, the manner, not of the Romans, but of the Greeks, who had in his time converted the diversion of cock-fighting into a species of gaming, and even to the total ruin of their families, as happens but too often in England at this day. The Romans, however, at last gave into the custom, though not till the decline of the empire. The first cause of contention between the two brothers Bassianus and Geta, sons of the emperor Septimius Severus, happened, according to Herodian, in their youth, about the fighting of their cocks; and if the battling between these two princes was the first instance of it, probably they had seen and learned it in Greece, whither they had often accompanied the emperor their father.

It is observable, that cocks and quails pitted for the purpose of engaging one another, a *outrance*, or to the last gasp, for diversion, are frequently compared, and with much propriety, to gladiators. Hence Pliny's expression, *Gallorum—cum gladiatorum*; and that of Columella, *rixosarum avium lanistæ*; *lanista* being the proper term for the master of the gladiators. Consequently one would expect, that when the bloody scenes of the amphitheatre were discarded, as they

were soon after the Christian religion became the establishment of the empire, the wanton shedding of mens blood in sport, being of too cruel and savage a nature to be patronised and encouraged in an institution so harmless and innocent as the Christian was, one might justly expect that the *σπορτομαχία* and the *αλεκτρομαχία* would have ceased of course. The fathers of the church are continually inveighing against the spectacles of the *arena*, and upbraiding their adversaries with them. These indeed were more unnatural and shocking than a main of cocks; but this, however, had a tendency towards infusing the like ferocity and implacability in the breasts and dispositions of men.

Besides, this mode of diversion has been in fact the bane and destruction of thousands here, as well as those of *lanistæ avium*, *cock-feeders*, mentioned by Columella, whose patrimonial fortunes were totally dissipated and destroyed by it.

The cock is not only a useful animal, but stately in his figure, and magnificent in his plumage. "*Imperiant suo generi*, says Pliny, *et regnum, in quacunque sunt domo, exercent.*" Aristophanes compares him to the king of Persia; authors must also take notice of the "*specatissimum insigne, ferratum, quod eorum verticem regia corona modo exornat.*" His tenderness towards his brood is such, that, contrary to the custom of many other males, he will scratch and provide for them with an assiduity almost equal to that of the hen; and his generosity is so great, that, on finding a hoard of meat, he will chuckle the hens together, and, without touching one bit himself, will relinquish the whole of it to them. He was called *the bird*, κατ' εἶδος, by many of the ancients; he was highly esteemed in some countries, and in others was even held sacred, inasmuch that one cannot but regret that a creature so useful and noble, should, by a strange fatality, be so enormously abused by us. It is true, our *αλεκτρομαχία*, or the massacre of Shrove Tuesday, is now in a declining way; and, in a few years, it is to be hoped, will be totally disused: but the cock-pit still continues a reproach to the humanity of Englishmen; and to their religion, the purest, the tenderest, and most compassionate, of all others, not excepting even the Brachmannic.

It is unknown when the pitched battle first entered England; but it was probably brought thither by the Romans. The bird was here before Cæsar's arrival; but no notice of his fighting occurs earlier than the time of William Fitz-Stephen, who wrote the life of archbishop Becket, some time in the reign of Henry II. and describes the cocking as a sport of school-boys on Shrove Tuesday. From this time at least, the diversion, however absurd, and even impious, was continued amongst us. It was followed, though disapproved and prohibited by Edward III.; also in the reign of Henry VIII.; and A. D. 1569. It has by some been called a *royal diversion*; and, as every one knows, the cock-pit at Whitehall was erected by a crowned head, for the more magnificent celebration of it. There was another pit in Drury-lane, and another in Javin-street. It was prohibited, however, by one of Oliver's acts, March 31st 1764. What aggravates the reproach and disgrace upon Englishmen, are those species of fighting which are called the

Cock-pit
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Cocker-
mouth.

Battle-royal and the *Welsh-main*, known nowhere in the world but there; neither in China, nor in Persia, nor in Malacca, nor among the savage tribes in America. These are scenes too bloody as almost to be too shocking to relate; and yet, as many may not be acquainted with the horrible nature of them, it may be proper for the excitement of our aversion and detestation to describe them in a few words. In the former, an unlimited number of fowls are pitted; and when they have slaughtered one another for the diversion (*Du bout!*) of the otherwise generous and humane Englishman, the fingle surviving bird is to be esteemed the victor, and carries away the prize. The *Welsh-main* consists, we will suppose of 16 pair of cocks; of these, the 16 conquerors are pitted a second time; the 8 conquerors of these are pitted a third time; the 4 conquerors the fourth time; and lastly, the two conquerors of these are pitted the fifth time; so that, (incredible barbarity!) 31 cocks are sure to be most inhumanely murdered for the sport and pleasure, the noise and nonsense, nay (we may say) the profane cursing and swearing, of those who have the effrontery to call themselves, with all these bloody doings, and with all this impiety about them, *Christians*.

COCK-PIT, of a ship of war, the apartment of the surgeon and his mates; being the place where the wounded men are dressed in time of battle, or otherwise. It is situated under the lower deck.

COCKSWAIN, or **COXEN**; an officer on board a man of war, who has the care of the barge, and all things belonging to it, and must be already with his crew to man the boat on all occasions: he sits at the stern of the boat, and steers.

COCKERMOUTH, a town of Cumberland in England, situated in W. Long. 3. 12. N. Lat. 54. 35. It is a large town irregularly built, with broad streets. It is washed by the Derwent on the western side; divided in two by the Cocker; and the parts are connected by a stone-bridge of one single arch. The number of inhabitants is between three and four thousand: the manufactures are shalloons, worsted stockings, and hats; the last exported from Glasgow to the West Indies. It is a borough-town, and the right of voting is vested by burges tenure in certain houses: this is also the town where the county elections are made.—Here is a castle seated on an artificial mount on a bank above the Derwent. It is a square building, and strengthened with several square towers: on each side of the inner gate are two deep dungeons capable of holding 50 persons in either; they are vaulted at top, and have only a small opening in order to lower through it the unhappy prisoners into this dire prison; and on the outside of each is a narrow slit with a slope from it, down which were shot the provisions allotted for the wretched inhabitants. This castle was founded by Waldo, first lord of Alderdale, and son of Gospatrick earl of Northumberland, cotemporary with William the Conqueror. Waldo resided first at Papcastle, which he afterwards demolished; and with the materials built that at Cocker-mouth, where he and his family long resided; but several arms over the gate-way, which Camden says are those of the *Mulsons*, *Hunfravilles*, *Lucies*, and *Piercies*, evince it to have belonged in later times to

those families. It appears that it was first granted by Edward II. to Anthony de Lucie, son of Thomas de Multon, who had assumed that name, because his mother was daughter and co-heiress to Richard de Lucie; and afterwards, by marriages, this castle and its honours descended to the Hunfravilles, and finally to the Piercies. In 1658, it was garrisoned for the king; and being besieged and taken by the rebels, was burnt, and never afterwards repaired.

COCKET, is a seal belonging to the king's custom-house, or rather a scroll of parchment sealed and delivered by the officers of the customs to merchants, as a warrant that their merchandises are customed.

It is also used for the office where goods transported were first entered, and paid their custom, and had a cocket or certificate of discharge.

COCKLE, in ichthyology. See **CARDIUM**.

COCOA, in botany. See **COCOS**.

COCONATO, a town of Piedmont in Italy, famous for being the birth-place of Columbus, who first discovered America: E. Long. 8. 0. N. Lat. 44. 50.

COCOS, the **COCOA-NUT TREE**; a genus of the order of palmæ, belonging to the monœcia class of plants. There is only one species known, which is cultivated in both the Indies, and is of the greatest use to the inhabitants. It is supposed to be a native of the Maldivæ and some desert islands in the East Indies; and from thence to have been transported to all the warm parts of America; for it is not found in any of the inland parts, nor any where far distant from settlements. The tree frequently rises 60 feet high. The body of the trunk, which generally leans to one side, occasioned, as is supposed, by the great weight of nuts it sustains when young, is the exact shape of an apothecary's large iron pestle, being of an equal thickness at top and at bottom, but somewhat smaller in the middle; its colour is of a pale brown throughout, and the bark smooth. The leaves or branches are often 14 or 15 feet long, about 28 in number, winged, of a yellow colour, straight and tapering. The pinne, or partial leaves are green, often three feet long next the trunk, but diminishing in length toward the extremity of the branches. The branches are fastened at top by brown stringy threads that grow out of them, of the size of ordinary pack-thread, and are interwoven like a web. The nuts hang at the top of the trunk, in clusters of a dozen each. Each nut, next the stem, has three holes closely stopped; one of them being wider, and more easily penetrated than the rest. When the kernel begins to grow, it incrusts the inside of the nut in a bluish, jelly-like substance; as this grows harder, the inclosed liquid, distilled into the nut from the roots, becomes somewhat acid; and the kernel, as the nut ripens, becomes still more solid; and at length lines the whole inside of the nut for above a quarter of an inch thick, being as white as snow, and of the flavour of an almond. The quantity of liquor in a full grown nut is frequently a pint and upwards. The husky tegument of the nut consists of strong, tough, stringy filaments, which, when removed from the fruit, resemble coarse oakum, and may perhaps be conveniently enough used as such. The shells of these nuts, being tipped with silver, are frequently used for drinking bowls. The bark of the tree may be wrought into

Cocket
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Cocos.

into cordage, and the leaves into baskets, brooms, hammocks in form of nets, mats, sacks, and other useful utensils. The liquor contained in the shell is a moist cooling, wholesome beverage in those sultry climates, and the white kernel a moist agreeable food. The Maldivé cocoa-nut is esteemed, by the inhabitants of these islands, as a powerful antidote against the bites of serpents and other poisons. The cocoa-nut tree is propagated by planting the nuts; which, in six weeks or two months time, will come up, provided they are fresh and thoroughly ripe; but this is what few of them are when brought into this country; for they always gather them before they are ripe, that they may keep during their passage. The best way, therefore, would be to gather such nuts as are thoroughly ripe in their native country, and plant them in a tub of dry sand, in order to keep them from the vermin during their passage. Here they will frequently sprout, which will be an advantage, as they may then be immediately planted in pots of earth, and plunged in the bark-stove.

COCTION, a general term for all alterations made in bodies by the application of fire or heat.

COCYTUS, one of the rivers of hell, according to the theology of the poets. It has its name *αἰὼς τοῦ κλάυου*, from groaning and lamenting. Hence Milton,

*Cocytus nam'd of lamentation loud,
Heard on the woeful stream.*

It was a branch of the river Styx; and flowed, according to Horace, with a dull and languid stream.

COD, in ichthyology. See GADUS, and FISHERY.

COD is also a term used, in some parts of the kingdom, for a pod. See POD.

COD-GAPE, a promontory on the coast of New England, near the entrance of Boston harbour, W. Long. 69. 50. N. Lat. 42. 0.

CODDY-MODDY, the English name of a species of LARUS.

CODE, *codex*, a collection of the laws and constitutions of the Roman emperors, made by order of Justinian.

The code is accounted the second volume of the civil law, and contains twelve books; the matter of which is nearly the same with that of the digests, especially the first eight books: but the style is neither so pure, nor the method so accurate, as that of the digests; and it determines matters of daily use, whereas the digests discuss the more abstruse and subtle questions of the law, giving the various opinions of the ancient lawyers. Although Justinian's code is distinguished by the appellation of *code*, by way of eminence, yet there were codes before his time; such were, 1. The Gregorian code, and Hermogenean code; collections of the Roman laws, made by two famous lawyers, Gregorius and Hermogenes, which included the constitutions of the emperors from Adrian to Dioclesian and Maximinus. 2. The Theodosian code, comprised in 16 books, formed out of the constitutions of the emperors from Constantine the Great to Theodosius the Younger: this was observed almost over all the west, till it was abrogated by the Justinian code. There are also several later codes, particularly the ancient Gothic, and those of the French kings; as the

code of Euridic, code-Lewis, code-Henry, code-Marchande, code des Eaux, &c.; and the present king of Prussia has lately published a code, which comprizes the laws of his kingdom in a very small volume.

CODEX, in antiquity, denotes a book or tablet on which the ancients wrote. It was of the bark of a tree, of ivory, of parchment, or of paper.

CODIA, among botanists, signifies the head of any plant, but more particularly a poppy-head; whence its syrup is called *diacodum*.

CODICIL, is a writing, by way of supplement to a will, when any thing is omitted that the testator would have added, or wants to be explained, altered, or recalled.

CODLIN, an apple useful in the kitchen, being the most proper for baking.

CODLING, an appellation given to the cod-fish when young. See GADUS.

CODON, *Καδων*, in antiquity, a cymbal, or rather little brass bell, resembling the head of a poppy. They were fastened to the trappings and bridles of horses.

CODRINGTON (Christopher,) a brave English officer, and not less distinguished for his learning and benevolence; was born at Barbadoes in the year 1668, and educated at Oxford; after which he betook himself to the army, and, by his merit and courage, soon recommending himself to the favour of king William, was made a captain in the first regiment of foot-guards. He was at the siege of Namur in 1695; and, upon the conclusion of the peace of Ryfwick, was made captain-general and governor in chief of the Leeward and Caribbee islands. However, in 1701, several articles were exhibited against him to the house of commons in England; to which he published a distinct and particular answer, and was honourably acquitted of all imputations. In 1703, he shewed great bravery at the attack of Guadaloupe: but at last he resigned his government, and lived a studious retired life; for a few years before his death, he chiefly applied himself to church-history and metaphysics. He died at Barbadoes, on the 7th of April 1710, and was buried there the day following; but his body was afterwards brought over to England, and interred, on the 19th of June 1716, in the chapel of All-Souls College, Oxford. By his last will, he bequeathed his plantations in Barbadoes, and part of the island of Barbuda, to the society for propagating the gospel in foreign parts; and left a noble legacy to All-Souls College, of which he had been a fellow. This legacy consisted of his library, which was valued at 6000 l.; and 10,000 l. to be laid out, 6000 in building a library, and 4000 in furnishing it with books. He wrote some of the poems in the *Musæ Anglicanæ*, printed at London in 1741.

CODRUS, the last king of the Athenians, fell in the defence of his country against the Heraclides. See ATTICA, n^o 26.

COECUM, or BLIND-GUT. See ANATOMY, n^o 354.

Dr Musgrave gives us an account, in the Philosophical Transactions, of the cœcum of a dog being cut out, without any prejudice to the animal. Mr Giles gives us another of the cœcum of a lady being distended, so as to form a tumour that held almost three chopins of a thin, greyish, almost liquid substance, of which she died. And Mr Knowler a third, of a boy's cœcum being

Coefficients

Coenobium

being vastly extended and stuffed with cherry-stones, which likewise proved mortal.

COEFFICIENTS, in algebra, are such numbers, or known quantities, as are put before letters or quantities, whether known or unknown, and into which they are supposed to be multiplied. Thus, in $3x$, ax , or bx ; 3 , a and b , are the coefficients of x ; and in $6a$, $9b$, 6 , and 9 , are the coefficients of a and b . See **ALGEBRA**.

COELESTIAL, or **CELESTIAL**, in general, denotes any thing belonging to the heavens: thus we say, celestial observations, the celestial globe, &c.

COELIAC ARTERY, in anatomy, that artery which issues from the aorta, just below the diaphragm. See **ANATOMY**, n^o 387. f.

COELIAC Passion. See (the *Index* subjoined to) **MEDICINE**.

COELIAC Vein, in anatomy, that running through the intestinum rectum, along with the coeliac artery.

COELOMA, among physicians, a hollow ulcer, seated in the tunica cornea of the eye.

COELUS, heaven, in Pagan mythology, the son of Æther and Dies, or Air and Day. According to Hesiod, he married Terra, or the Earth; on whom he begat Oura, or the Mountains, the Ocean, &c. But having at length imprisoned the Cyclops, who were also his children, his wife, being offended, incited her son Saturn to revenge the injury done to his brothers; and, by her assistance, he bound and castrated Coelus, when the blood that flowed from the wound produced the three furies, the giants, and the wood-nymphs; and the genital parts being thrown into the sea, impregnated the waters, and formed the goddess Venus. This deity was called by the Greeks *Uranus*.

COEMETERY. See **CEMETERY**.

COENOBITE, a religious who lives in a convent, or in community, under a certain rule; in opposition to anachoret, or hermit, who lives in solitude. The word comes from the Greek *κοινος*, *communis*; and *βίος*, *vita*, life. Cassian makes this difference between a *convent* and a *monastery*, that the latter may be applied to the residence of a single religious, or recluse; whereas the *convent* implies *coenobites*, or numbers of religious living in common. Fleury speaks of three kinds of monks in Egypt; *anachorets*, who live in solitude; *coenobites*, who continue to live in community; and *sarabaites*, who are a kind of monk-errant, that stroll from place to place. He refers the institution of coenobites to the times of the apostles, and makes it a kind of imitation of the ordinary lives of the faithful at Jerusalem. Though St Pachomius is ordinarily owned the institutor of the coenobite life; as being the first who gave a rule to any community.

COENOBIVM, *κοινωβιον*, the state of living in a society, or community, where all things are common. Pythagoras is thought to be the author or first institutor of this kind of life; his disciples, though some hundreds in number, being obliged to give up all their private estates, in order to be annexed to the joint stock of the whole. The Essenians among the Jews, and Platonists, are said to have lived in the same manner. Many of the Christians also have thought this the most perfect kind of society, as being that in which Christ and his apostles chose to live.

Coesfeldt

Coffea

COESFELDT, a town of Germany, in Westphalia, and in the territories of the bishop of Munster, where he often resides. It is near the river Burkel, E. Long. 64. 2. N. Lat. 51. 58.

COEVORDEN, one of the strongest towns in the United Provinces, in Overijssel, fortified by the famous Cohorn. It was taken by the bishop of Munster, 1673; and the Dutch retook it the same year. It is surrounded by a morass. E. Long. 6. 41. N. Lat. 52. 40.

COFFEA, the **COFFEE-TREE**; a genus of the monogynia order, belonging to the pentandria class of plants. There is but one species, supposed to be a native of Arabia Felix. It seldom rises more than 16 or 18 feet in height; the main stem grows upright, and is covered with a light brown bark; the branches are produced horizontally and opposite, crossing each other at every joint; so that every side of the tree is fully garnished with them, and they form a sort of pyramid. The leaves also stand opposite; and, when fully grown, are about four or five inches long, and two broad in the middle, decreasing toward each end; the borders are waved, and the surface is of a lucid green. The flowers are produced in clusters at the root of the leaves, sitting close to the branches; they are tubulous, and spread open at the top, where they are divided into five parts; they are of a pure white, and have a very grateful odour, but are of short duration. The fruit, which is the only useful part, resembles a cherry. It grows in clusters, and is ranged along the branches under the axillæ of the leaves of the same green as the laurel, but something longer. When it comes to be of a deep red, it is gathered for the mill, in order to be manufactured into those *coffee-beans* now so generally known. The mill is composed of two wooden rollers furnished with iron plates 18 inches long, and ten or twelve in diameter. These moveable rollers are made to approach a third which is fixed, and which they call the *chops*. Above the rollers is a hopper, in which they put the coffee, from whence it falls between the rollers and the chops, where it is stripped of its first skin, and divided into two parts, as may be seen by the form of it after it has undergone this operation; being flat on the one side, and round on the other. From this machine it falls into a brass sieve, where the skin drops between the wires, while the fruit slides over them into baskets placed ready to receive it: it is then thrown into a vessel full of water, where it soaks for one night, and is afterwards thoroughly washed. When the whole is finished, and well dried, it is put into another machine called the *peeling-mill*. This is a wooden grinder, turned vertically upon its treadle by a mule or horse. In passing over the coffee it takes off the parchment, which is nothing but a thin skin that detaches itself from the berry in proportion as it grows dry. The parchment being removed, it is taken out of this mill to be put into another, which is called the *winnowing-mill*. This machine is provided with four pieces of tin fixed upon an axle, which is turned by a slave, with considerable force; and the wind that is made by the motion of these plates clears the coffee of all the pellicles that are mixed with it. It is afterwards put upon a table, where the broken berries, and

Coffee.

and any filth that may remain among them, are separated by negroes, after which the coffee is fit for sale.

The coffee-tree is cultivated in Arabia, Persia, the East-Indies, the Isle of Bourbon, and several parts of America. It is also raised in botanic gardens in several parts of Europe. Prince Eugene's garden at Vienna produced more coffee than was sufficient for his own consumption. It delights particularly in hills and mountains, where its root is almost always dry, and its head frequently watered with gentle showers. It prefers a western aspect, and ploughed ground without any appearance of grass. The plants should be placed at eight feet distance from each other, and in holes twelve or fifteen inches deep. If left to themselves, they would rise to the height of 16 or 18 feet, as already observed; but they are generally stunted to five, for the convenience of gathering their fruit with the greater ease. Thus dwarfed, they extend their branches so, that they cover the whole spot round about them. They begin to yield fruit the third year, but are not in full bearing till the fifth. With the same infirmities that most other trees are subject to, these are likewise in danger of being destroyed by a worm, or by the scorching rays of the sun. The hills where the coffee-trees are found, have generally a gravelly or chalky bottom. In the last, it languishes for some time and then dies: in the former, its roots, which seldom fail of striking between stones, obtain nourishment, and keep the tree alive, and fruitful for 30 years. This is nearly the period for plants of the coffee-tree. The proprietor, at the end of this period, not only finds himself without trees, but has his land reduced, that it is not fit for any kind of culture; and unless he is so situated, that he can break up a spot of virgin land, to make himself amends for that which is totally exhausted by the coffee-tree, his loss is irreparable.

The coffee produced in Arabia is found so greatly to excel that raised in the American plantations or elsewhere, that the cultivation of the tree is now but seldom practised in any of the British colonies. Large plantations of this kind were formerly made, in some of them; and it was proposed to the parliament to give a proper encouragement for cultivating this commodity there, so as to enable the planters to undersell the importers from Arabia. Accordingly, there was an abatement of the duty payable on all coffee imported from our colonies in America, which at that time was supposed to be sufficient encouragement for this kind of commerce; but the inferiority of the American coffee to the Arabian, hath almost ruined the project. Mr Miller proposes some improvements in the method of cultivation. According to him, the trees are planted in too moist a soil, and the berries are gathered too soon. They ought, he says, to be permitted to remain on the trees till their skins are shrivelled, and they fall from the trees when shaken. This will indeed greatly diminish their weight, but the value of the commodity will thereby be increased to more than double of that which is gathered sooner. In Arabia, they always shake the berries off the trees, spreading cloths to receive them, and only take such as readily fall at each time. Another cause may be the method of drying the berries. They are, he ob-

serves, very apt to imbibe moisture, or the flavour of any thing placed near them. A bottle of rum placed in a closet, in which a canister of coffee-berries closely stopped was standing on a shelf at a considerable distance, in a few days fo impregnated the berries as to render them very disagreeable; the same hath also happened by a bottle of spirit of wine standing in the same closet with coffee and tea, both which were in a few days spoiled by it. Some years ago, a coffee ship from India had a few bags of pepper put on board, the flavour of which was imbibed by the coffee, and the whole cargo spoiled. For these reasons, Mr Miller directs that coffee-berries should never be brought over in ships freighted with rum, nor laid to dry in the houses where figs are boiled or rum distilled. When they are fully ripe, they should be shaken off when the trees are perfectly dry, and spread upon cloths in the sun to dry, carrying them every evening under cover, to prevent the dews or rain from falling on them. When perfectly dry, they should have their outer skins beaten off, and then be carefully packed up in cloths or bags three or four times double.

The coffee-tree, as we have already observed, is sometimes cultivated in European gardens; but for this it requires the assistance of a stove. It makes a fine appearance at all seasons of the year, (being an evergreen), but especially when in flower, and when the berries are red, which is generally in the winter, so that they continue a long time in that state. It is propagated from the berries; but they must be planted immediately when gathered from the tree, for they lose their vegetative quality in a very short time, when sent abroad by the post they have constantly failed in those that have been a fortnight on their journey; so that where these trees are desired, the young plants must be sent, if it be at any distance from the place where they grow. The fresh berries may be planted in small pots, and plunged into a hot-bed of tanners bark. If the bed be of a proper temperature, the young plants will appear in a month or five weeks time; and in six weeks more, will be ready for transplanting into separate pots. During summer, they must be frequently watered; but not in too great plenty, otherwise the roots will be apt to rot. The first sign of the plants being disordered is their leaves sweating out a clammy juice; after which they are over-run with insects, that cannot be destroyed till the plants have recovered their health; so that on the first appearance of these insects, the trees should be removed into fresh earth, and all possible care taken to recover them. The disorders incident to them, generally proceed either from their having been put into large pots, or from the earth about them being too stiff, or over-watered. The most proper soil for them, is that of a kitchen garden, which is naturally loose, and not subject to bind, especially if it has constantly been well wrought and dunged.

COFFEE also denotes a kind of drink, prepared from these berries; very familiar in Europe for these 80 years, and among the Turks for 150.

Its original is not well known. Some ascribe it to the prior of a monastery; who, being informed by a goat-herd

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goat-herd that his cattle sometimes browsing on the tree would wake and caper all night, became curious to prove its virtue: accordingly, he first tried it on his monks, to prevent their sleeping at mattins. Others, from Sehehabeddin, refer the invention of coffee to the Persians: from whom it was learned in the 15th century by Gemaleddin, musli of Aden, a city near the mouth of the red sea; and who having tried its virtues himself, and found that it dissipated the fumes which oppressed the head, inspired joy, opened the bowels, and prevented sleep, without being incommoded by it, recommended it first to his disciples, with whom he used to spend the night in prayer. Their example brought coffee into vogue at Aden; the professors of the law for study, artificers to work, travellers to walk in the night, in fine every body at Aden, drank coffee. Hence it passed to Mecca; where first the devotees, then the rest of the people, took it. From Arabia Felix it passed to Cairo. In 1511, Kahie Beg prohibited it, from a persuasion that it inebriated, and inclined to things forbidden. But Sultan Causim immediately after took off the prohibition; and coffee advanced from Egypt to Syria and Constantinople. The dervises declaimed against it from the Alcoran, which declares, that coal is not of the number of things created by God for food. Accordingly, the musli ordered the coffee-houses to be shut; but his successor declaring coffee not to be coal, they were opened again. During the war in Candia, the assemblies of news-mongers making too free with state affairs, the grand Vizier Cuprolì suppressed the coffee-houses at Constantinople; which suppression, though still on foot, does not prevent the public use of the liquor there. Thevenot, the traveller, was the first who brought it into France; and a Greek servant, named *Pasqua*, brought into England by Mr Dan. Edwards, a Turkey merchant, in 1652, to make his coffee, first set up the profession of *coffee-man*, and introduced the drink into this island.

The word *coffee* is originally Arabic: the Turks pronounce it *cabehh*, and the Arabians *cabwah*; which some authors maintain to be a general name for any thing that takes away the appetite, others for any thing that promotes appetite, and others again for any thing that gives strength and vigour.—The Mahometans, it is observed, distinguish three kinds of *cabwah*. The first is wine, or any liquor that inebriates; the second is made of the pods that contain the coffee-berry; this they call the *Sultan's coffee*, from their having first introduced it on account of its heating less than the berry, as well as its keeping the bowels open: the third is that made with the berry itself, which alone is used in Europe, the pods being found improper for transportation. Some Europeans who imported the pods called them the *flower of the coffee-tree*. The deep brown colour of the liquor occasioned its being called *syrup of the Indian mulberry*, under which specious name it first gained ground in Europe.

The preparation of coffee consists in roasting, or giving it a just degree of torrefaction on an earthen or metalline plate, till it have acquired a brownish hue equally deep on all sides. It is then ground in a mill, as much as serves the present occasion. A proper quantity of water is next boiled, and the ground coffee put

into it. After it has just boiled, it is taken from the fire, and the decoction having stood a while to settle and fine, they pour or decant it into dishes. The ordinary method of roasting coffee amongst us is in a tin cylindrical box full of holes, through the middle whereof runs a spit: under this is a femicircular hearth, whereon is a large charcoal-fire: by help of a jack the spit turns swift, and so roasts the berry; being now and then taken up to be shaken. When the oil rises, and it is grown of a dark brown colour, it is emptied into two receivers made with large hoops, whose bottoms are iron plates: there the coffee is shaken, and left till almost cold; and if it look bright and oily, it is a sign it is well done.

Very different accounts have been given of the medicinal qualities of this berry. To determine its real effects on the human body, Dr Percival has made several experiments, the result of which he gives in the following words: "From these observations we may infer, that coffee is slightly astringent, and antiseptic; that it moderates alimentary fermentation, and is powerfully sedative. Its action on the nervous system probably depends on the oil it contains; which receives its flavour, and is rendered milky empyreumatic, by the process of roasting. Neuman obtained by distillation from one pound of coffee, five ounces five drachms and a half of water, six ounces and half a drachm of thick fetid oil, and four ounces and two drachms of a caput mortuum. And it is well known, that rye, torrefied with a few almonds, which furnish the necessary proportion of oil, is now frequently employed as a substitute for these berries."

"The medicinal qualities of coffee seem to be derived from the grateful sensation which it produces in the stomach, and from the sedative powers it exerts on the *vis vitæ*. Hence it assists digestion, and relieves the head-ach; and is taken in large quantities, with peculiar propriety, by the Turks and Arabians; because it counteracts the narcotic effects of opium, to the use of which those nations are much addicted."

"In delicate habits, it often occasions watchfulness, tremors, and many of those complaints which are denominated nervous. It has been even suspected of producing palsies; and from my own observation, I should apprehend, not entirely without foundation. Slare affirms, that he became paralytic by the too liberal use of coffee, and that his disorder was removed by abstinence from that liquor."

"The following curious and important observation is extracted from a letter with which I was honoured by Sir John Pringle, in April 1773: "On reading your section concerning coffee, one quality occurred to me which I had observed of that liquor, confirming what you have said of its sedative virtues. It is the best abater of the paroxysms of the periodic asthma that I have seen. The coffee ought to be of the best Mocco, newly burnt, and made very strong immediately after grinding it. I have commonly ordered an ounce for one dish; which is to be repeated fresh after the interval of a quarter or half an hour; and which I direct to be taken without milk or sugar. The medicine in general is mentioned by Musgrave, in his treatise *De arthritide anomala*; but I first heard of it from a physician in this place, who having once practised

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practised it in Litchfield, had been informed by the old people of that place, that Sir John Floyer, during the latter year of his life, kept free from, or at least lived easy under, his asthma, from the use of very strong coffee. This discovery, it seems, he made after the publication of his book upon that disease." Since the receipt of that letter, I have frequently directed coffee in the asthma with great success."

COFFER, in architecture, a square depression or sinking in each interval between the modillions of the Corinthian cornice; ordinarily filled up with a rose; sometimes with a pomegranate, or other enrichment.

COFFER, in fortification, denotes a hollow lodgement, athwart a dry moat, from 6 to 7 feet deep, and from 16 to 18 broad; the upper part made of pieces of timber raised two feet above the level of the moat; which little elevation has hurdles laden with earth for its covering, and serves as a parapet with embrasures: the coffer is nearly the same with the caponiere, excepting that this last is sometimes made beyond the counterscarp on the glacis; and the coffer always in the moat taking up its whole breadth, which the caponiere does not. It differs from the traverse and gallery, in that these latter are made by the besiegers, and the coffer by the besieged. The besieged generally make use of coffers to repulse the besiegers when they endeavour to pass the ditch. To save themselves from the fire of these coffers, the besiegers throw up the earth on that side towards the coffer.

COFFERER of the KING'S HOUSEHOLD, a principal officer in the court, next under the comptroller, who, in the counting-house, and elsewhere at other times, has a special charge and oversight of other officers of the house, for their good demeanor and charge in their offices; to all which he pays their wages.

COFFIN, the chest in which dead bodies are put into the ground.

The sepulchral honours paid to the manes of departed friends, in ancient times, demand attention, and are extremely curious. Their being *put into a coffin* has been particularly considered as a mark of the highest distinction. With us the poorest people have their coffins. If the relations cannot afford them, the parish is at the expence. On the contrary, in the east they are not at all made use of in our times; Turks and Christians, as Thevenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner: neither was the body of our Lord, it should seem, put into a coffin; nor that of Elisha, 2 Kings xiii. 21. whose bones were touched by the corpse that was let down a little after into his sepulchre. However, that they were anciently made use of in Egypt, all agree; and antique *coffins of stone*, and *scamora-wood*, are still to be seen in that country; not to mention those said to be made of a kind of pasteboard; formed by folding or gluing cloth together a great many times, curiously plaited, and then painted with hieroglyphics. Its being an ancient Egyptian custom, and not practised in the neighbouring countries, were, doubtless, the cause that the sacred historian expressly observes of Joseph, that he

both being managements peculiar to the Egyptians.

Bishop Patrick, in his commentary on this passage, takes notice of these Egyptian coffins of sycamore wood, and of pasteboard; but he doth not mention the contrary usage in the neighbouring countries, which was requisite, one might suppose, in order fully to illustrate the place: but even this perhaps would not have conveyed the whole idea of the sacred author. Maillet apprehends that all were not inclosed in coffins who were laid in the Egyptian repositories of the dead; but that it was an honour appropriated to persons of figure: for after having given an account of several riches found in those chambers of death, he adds †, "But it must not be imagined that † Let. vii. p. 281. the bodies deposited in these gloomy apartments were all inclosed in *chests*, and placed in niches. The greatest part were simply embalmed and swathed after that manner which every one hath some notion of; after which they laid them one by the side of another without any ceremony. Some were even laid in these tombs without any embalming at all; or such a slight one, that there remains nothing of them in the linen in which they were wrapped, but the bones, and those half rotten. It is probable, that each considerable family had one of these burial-places to themselves; that the niches were designed for the bodies of the heads of the families; and that those of their domestics or slaves had no other care taken of them than the laying them on the ground, after having been embalmed, or even without that; which, without doubt, was also all that was done even to the heads of families of less distinction." After this he gives an account of a way of burial, practised anciently in that country, which had been but lately discovered; and which consisted in placing the bodies, after they were swathed, upon a layer of charcoal, and covering them with a mat, under a depth of sand of seven or eight feet.

That *coffins* then were not universally used in Egypt, is undoubted from these accounts; and probably they were only persons of distinction who were buried in them. It is also reasonable to believe, that in times so remote as that of Joseph, they might be much less common than afterwards; and consequently, that Joseph's being put in a coffin in Egypt might be mentioned with a design to express the great honours which the Egyptians did him at his death, as well as in life, being interred after the most sumptuous manner of the Egyptians, *embalmed*, and *put into a coffin*. Agreeably to this, the Septuagint version, which was made for Egyptians, seems to represent coffins as a mark of grandeur. Job xxi. 32.

It is no objection to this account, that the widow of Nain's son is represented as carried forth to be buried in a *osq*, or "on a bier:" for the present inhabitants of the Levant, who are well known to lay their dead bodies in the earth uninclosed, carry them frequently out to burial in a kind of coffin. So Dr Russell, in particular, describes the bier used for the Turks at Aleppo, as a kind of coffin much in the form of ours, only that the lid rises with a ledge in the middle. Christians indeed, as he tells us, are carried to the grave on an open bier: but as the most common kind of bier resembles our coffins, that used

* Gen. l. 26. was not only embalmed, but put into a coffin too *;

Cogitation by the people of Nain might very possibly be of the same kind; in which case the word *cogitatio* was very proper.

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COGITATION, a term used by some for the act of thinking.

COGNAC, a town of France in Angoumois, with a castle, where Francis I. was born. It is seated on the river Charante, in a very pleasant country, abounding in wine, and remarkable for excellent brandy. W. Long. o. 10. N. Lat. 45. 42.

COGNATE, in Scots law, any male relation thro' the mother.

COGNATION, in the civil law, a term for that line of consanguinity which is between males and females, both descended from the same father; as agnation is for the line of parentage between males only descended from the same flock.

COGNI, an ancient and strong town of Caramania in Turkey in Asia, and the residence of a beglerbeg. It is seated in a pleasant country, abounding in corn, fruits, pulse, and cattle. Here are sheep whose tails weigh 30 pounds. E. Long. 32. 56. N. Lat. 37. 56.

COGNITIONIS CAUSA, in Scots law. When a creditor charges the heir of his debtor to enter, in order to constitute the debt against him, and the heir renounces the succession, the creditor can obtain no decret of constitution of that debt against the heir; but only a decret subjecting the *hereditas jacens*, or the estate which belonged to the debtor, to his diligence: and this is called a decret *cognitionis causa*.

COGNIZANCE, or **CONNUSSANCE**, in law, has divers significations. Sometimes it is an acknowledgement of a fine, or confession of something done; sometimes the hearing of a matter judicially, as to take cognizance of a cause; and sometimes a particular jurisdiction, as cognizance of pleas is an authority to call a cause or plea out of another court, which no person can do but the king, except he can show a charter for it. This cognizance is a privilege granted to a city or a town to hold plea of all contracts, &c. within the liberty; and if any one is impleaded for such matters in the courts at Westminster, the mayor, &c. of such franchise may demand cognizance of the plea, and that it may be determined before them.

COGNIZANCE is also used for a badge on a waterman's, or serving-man's sleeve, which is commonly the giver's crest, whereby he is decreed to belong to this or that nobleman or gentleman.

COGS, or **COGGLES**, a kind of flat-bottomed boats used on rivers.

COHABITATION, denotes the state of a man and a woman who live together without being legally married. By the common law of Scotland, cohabitation for year and day, or a complete twelvemonth, is deemed equivalent to matrimony.

CO-HEIR, one who succeeds to a share of an inheritance, to be divided among several.

COHESION, one of the four species of attraction, denoting that force by which the parts of bodies adhere or stick together.

This power was first considered by Sir Isaac Newton as one of the properties essential to all matter, and the cause of all that variety we observe in the texture of different terrestrial bodies. He did not, however,

absolutely determine that the power of cohesion was an immaterial one; but thought it might possibly arise, as well as that of gravitation, from the action of an ether. His account of the original constitution of matter is as follows: "It seems probable, that God in the beginning formed *matter* in solid, massy, impenetrable, moveable particles; of such sizes, figures, and other properties, and in such proportion to space, as most conduced to the end for which he formed them: and that these primitive particles being solid, are incomparably harder than any porous bodies composed of them; even so very hard as never to wear or break in pieces; no ordinary power being able to divide what God himself made one at the first creation. While the particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of all things depending on them would be changed. Water and earth composed of old worn particles and fragments of particles, would not now be of the same texture with water and earth composed of entire particles in the beginning. And therefore, that nature may be lasting, the changes of corporeal things are to be placed in the various separations and new associations and motions of these permanent particles; compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together and touch in a few points." It seems farther, "That these particles have not only a *vis inertiae*, accompanied with such passive laws of motion as naturally result from that force; but also that they are moved by certain active principles, such as that of gravity, and that which causeth fermentation and the cohesion of bodies. These principles are to be considered not as occult qualities, supposed to result from the specific forms of things, but as general laws of nature by which the things themselves are formed; their truth appearing to us by phenomena, though their cause is not yet discovered."

The general law of nature, by which all the different bodies in the universe are composed, according to Sir Isaac Newton, is that of attraction: *i. e.* "Every particle of matter has an attractive force, or a tendency to every other particle; which power is strongest in the point of contact, and suddenly decreases, inasmuch that it acts no more at the least sensible distance; and at a greater distance is converted into a repellent force, whereby the parts fly from each other. On this principle of attraction may we account for the cohesion of bodies, otherwise inexplicable."

"The smallest particles may cohere by the strongest attractions, and compose bigger particles of weaker virtue; and many of these may cohere, and compose bigger particles, whose virtue is still less; and so on for divers successions, until the progression end in the biggest particles, on which the operations in chemistry, and the colours of natural bodies, depend; and which, by cohering, compose bodies of a sensible magnitude. If the body is compact, and bends or yields inward to pressure without any sliding of its parts, it is hard and elastic; returning to its figure with a force arising from the mutual attraction of its parts. If the parts slide from one another, the body is malleable or soft."

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2 His account of the original constitution of matter.

3 Attraction, the general law of nature.

4 Formation of particles of different sizes.

5 Distinction of bodies into hard, soft, humid &c.

1 Considered by Sir Isaac Newton as an essential property of matter.

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If they slip easily, and are of a fit size to be agitated by heat, and the heat is great enough to keep them in agitation, the body is fluid; and if it be apt to stick to things, it is humid; and the drops of every fluid affect a round figure by the mutual attractions of their parts, as the globe of the earth and sea affects a round figure from the mutual attraction and gravity of its parts.

“ Since metals dissolved in acids attract but a small quantity of the acid, their attractive force reaches but to a small distance. Now, as in algebra, where affirmative quantities cease, there negative ones begin; so in mechanics, where attraction ceases, there a repulsive virtue must succeed. That there really is such a virtue seems to follow from the reflections and inflections of the rays of light; the rays being repelled by bodies in both these cases without the immediate contact of the reflecting or inflecting body. The same thing seems also to follow from the emission of light; a ray, as soon as shaken off from a body by the vibrating motion of the parts of the body, and got beyond the reach of attraction, being driven away with exceeding great velocity: for that force which is sufficient to turn it back in reflection may be sufficient to emit it. From the same repelling power it seems to be that flies walk upon the water without wetting their feet; that the object-glasses of long telescopes lie upon one another without touching; and that dry powders are difficultly made to touch one another so as to stick together, without melting them or wetting them with water, which, by exhaling, may bring them together.

“ The particles of all hard homogeneous bodies which touch one another, cohere with a great force: to account for which, some philosophers have recourse to a kind of hooked atoms, which in effect is nothing else but to beg the question. Others imagine, that the particles of bodies are connected by rest, *i. e.* in effect by nothing at all; and others, by conspiring motions, *i. e.* by a relative rest among themselves. For myself, it rather appears to me, that the particles of bodies cohere by an attractive force, whereby they tend mutually to each other.”

From this account of the formation and constitution of bodies, we can conclude nothing, except that they are composed of an infinite number of little particles, kept together by a force or power; but of what nature that power is, whether material or immaterial, we must remain ignorant till farther experiments are made. Some of the Newtonian philosophers, however, have positively determined these powers to be immaterial. In consequence of this supposition, they have so refined upon attractions and repulsions, that their systems seem not far from downright scepticism, or denying the existence of matter altogether. A system of this kind we find adopted by Dr Priestley *, from Messrs Boscovich and Michell, in order to solve some difficulties concerning the Newtonian doctrine of light. “ The easiest method (says he) of solving all difficulties, is to adopt the hypothesis of Mr Boscovich, who supposes that matter is not impenetrable, as has been perhaps universally taken for granted; but that it consists of physical points only, endued with powers of attraction and repulsion in the same manner as solid matter is generally supposed to be: provided there-

fore that any body move with a sufficient degree of velocity, or have a sufficient *momentum* to overcome any powers of repulsion that it may meet with, it will find no difficulty in making its way through any body whatever; for nothing else will penetrate one another but powers, such as we know do in fact exist in the flame place, and counterbalance or over-rule one another. The most obvious difficulty, and indeed almost the only one that attends this hypothesis, as it supposes the mutual penetrability of matter, arises from the idea of the nature of matter, and the difficulty we meet with in attempting to force two bodies into the same place. But it is demonstrable that the first obstruction arises from no actual contact of matter, but from mere powers of repulsion. This difficulty we can overcome; and having got within one sphere of repulsion, we fancy that we are now impeded by the solid matter itself. But the very fame is the opinion of the generality of mankind with respect to the first obstruction. Why, therefore, may not the next be only another sphere of repulsion, which may only require a greater force than we can apply to overcome it, without disordering the arrangement of the constituent particles; but which may be overcome by a body moving with the amazing velocity of light.

“ This scheme of the immateriality of matter, as it may be called, or rather the mutual penetration of matter, first occurred to Mr Michell on reading Baxter on the immateriality of the Soul. He found that this author's idea of matter was, that it consisted as it were of bricks cemented together with immaterial mortar. These bricks, if he would be consistent with his own reasoning, were again composed of less bricks, cemented likewise by an immaterial mortar; and so on *ad infinitum*. This putting Mr Michell upon the consideration of the several appearances of nature, he began to perceive that the bricks were so covered with this immaterial mortar, that if they had any existence at all, it could not possibly be perceived; every effect being produced, in nine instances of ten certainly, and probably in the tenth also, by this immaterial, spiritual, and penetrable mortar. Instead therefore of placing the world upon the giant, the giant upon the tortoise, and the tortoise upon he could not tell what, he placed the world at once upon itself.”

Other philosophers have supposed the powers both of gravitation and cohesion to be material; and to be only different actions of the ethereal fluid, or elementary fire. In support of this it hath been urged, that before we have recourse to a spiritual and immaterial power as the cause of any natural phenomenon, we ought to be well assured that there is no material substance with which we are acquainted, that is capable of producing such effects. In the present case, we are so far from having such assurance, that the contrary is manifest to our senses. One instance of this is in the experiment with the *Magdeburg hemispheres*, as they are called. These are two hollow hemispheres of brass, exactly fitted to one another, so as to form one globe when joined together, without admitting any air at the joining. In this state, if the air within them is exhausted by means of a pump, they will

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Bodies oppose each other not from actual contact.

Mr Baxter's opinion.

Cohesion supposed owing to elementary fire.

6
Existence of repulsive power proved.

7
No conclusion to be drawn from this account.

11
Hyp. of Vision, Vol. I. P. 392.
8
Mr Michell's hypothesis adopted by Dr Priestley.

Cohesion.

cohere with such force, if they are five or six inches diameter, as to require a weight of some hundreds of pounds to separate them. The pressure of the atmosphere, we see, is in this case capable of producing a very strong cohesion; and if there is in nature any fluid more penetrating, as well as more powerful in its effects, than the air we breathe, it is possible that what is called the *attraction of cohesion* may some how or other be an effect of the action of that fluid. Such a fluid as this is the element of fire. Its activity is such as to penetrate all bodies whatever; and in the state in which it is commonly called *fire*, it acts according to the quantity of solid matter contained in the body. In this state, it is capable of dissolving the strongest cohesions observed in nature: but whatever is capable of dissolving any cohesion, must necessarily be endued with greater power than that by which the cohesion is caused. Fire, therefore, being able to dissolve cohesions, must also be capable of causing them, provided its power is exerted for that purpose. Nor will it seem at all strange that this fluid should act in two such opposite ways, when we consider the different appearances which it assumes. These are three, *viz.* fire, or heat, in which it consumes, destroys and dissolves; light, in which it seems deprived of all destructive or dissolvent power, and to be the most mild, quiet, and placid being in nature. The third state of this element is, when it becomes what is called the *electric fluid*; and then it attracts, repels, and moves bodies, in a vast variety of ways, without either burning or rendering them visible by its light. In this state it is not less powerful than in either of the other two; for a violent shock of electricity will displace and tear in pieces the most heavy and solid bodies. The seeming capricious nature of this fluid, however, probably renders it less suspected as the cause of cohesion, than it otherwise would be, were the attractions regular and permanent, which we observe it to occasion. But here we must observe, that the fluid has an existence in all bodies before the experiments are tried which make its effects visible to us, and was acting in them according to its settled and established laws. While acting in this manner it was perfectly invisible; and all we can do is, to produce some little infringement of these regular laws according to which it commonly acts. In some cases, however, the electrical attractions produced by art are found to be pretty permanent and strong. Thus, Mr Symmer, in some experiments with silk stockings, found their attraction so strong, that it required upwards of 15 pounds weight to separate them from each other; and this attraction would continue for more than an hour. In plates of glass, too, he observed a remarkable cohesion when electrified. In the Philosophical Transactions for 1777, we find this hypothesis taken notice of, and in some measure adopted, by Mr Henry. "Some gentlemen (says he) have supposed that the electric matter is the cause of the cohesion of the particles of bodies. If the electric matter be, as I suspect, a real elementary fire inherent in all bodies, that opinion may probably be well founded: and perhaps the folding of metals, and the cementation of iron, by fire, may be considered as strong proofs of the truth of their hypothesis."

Cohesion
Coiling.

On this last hypothesis we must observe, that if the electric, or any other fluid, is supposed to be the cause of the attraction of cohesion universally, the particles of that fluid must be destitute of all cohesion between themselves; otherwise we should be at as great a loss to account for the cohesion of these particles, as for that of terrestrial matter. Philosophers, indeed, do not suppose any cohesion between the particles of the electric fluid themselves; it is generally believed that the particles of this fluid are repulsive of one another, though attracted by all other matter. If this is a fact, we cannot suppose the electric fluid to be the cause of cohesion. The probability or improbability of the hypothesis just mentioned, must greatly depend on its being ascertained whether the particles of the electric fluid do really repel one another, and attract all other kinds of matter, or not; but for this we must refer to the article *ELECTRICITY*.

COHOBATION, in chemistry, an operation by which the same liquor is frequently distilled from the same body, either with an intention to dissolve this body, or to produce some change upon it. This is one of those operations which the ancient chemists practised with great patience and zeal, and which are now neglected. To make this operation easier, and to prevent the trouble of frequently changing the vessels, a particular kind of alembic, called a *pelican*, was invented. This vessel was made in the form of a cucurbit with an alembic-head, but had two spouts communicating with the body. As the vapour rose up into the head, it was gradually condensed, and ran down the spouts into the body of the pelican, from whence it was again distilled; and so on. This vessel is represented Plate LXXVII. fig. 6.

COHORN (N.) the greatest engineer Holland has produced. Among his other works, which are esteemed master-pieces of skill, he fortified Bergen-op-zoom; which, to the surprise of all Europe, was taken by the French in 1747. He wrote a treatise on fortification; and died in 1704.

COHORT, in Roman antiquity, the name of part of the Roman legion, comprehending about 600 men. There were ten cohorts in a legion, the first of which exceeded all the rest both in dignity and number of men. When the army was ranged in order of battle, the first cohort took up the right of the first line; the rest followed in their natural order: so that the third was in the centre of the first line of the legion, and the fifth on the left; the second between the first and third; and the fourth between the third and fifth: the five remaining cohorts formed a second line in their natural order.

COIF, the badge of a serjeant at law, who is called serjeant of the coif, from the lawn coif they wear under their caps, when they are created serjeants.

The chief use of the coif was to cover the clerical tonsure. See *TONSURE*.

COILING, on shipboard, implies a sort of serpentine winding of a cable or other rope, that it may occupy a small space in the ship. Each of the windings of this sort is called a *fak*; and one range of fakes upon the same line is called a *tier*. There are generally from five to seven fakes in a tier; and three or four tiers in the whole length of a cable. This, however,

however, depends on the extent of the fakes. The smaller ropes employed about the sails are coiled upon *cleats* at sea, to prevent their being entangled amongst one another in traversing, contracting, or extending the sails.

COLON, in the ancient Grecian theatres, the fame with the cavea of the Romans.

COMBRA, a handfome, large, and celebrated town of Portugal, capital of the province of Beira, with a bifhop's fee, and a famous univerfity. The cathedral and the fountains are very magnificent. It is feated in a very pleafant country abounding in vineyards, olive-trees, and fruits. It ftands on a mountain, by the fide of the river Mondego. W. Long. 8. 57. N. Lat. 40. 10.

COIN, a piece of metal converted into money by the impreffing of certain marks or figures thereon.

Coin differs from *MONEY* as the fpecies from the genus. *Money* is any matter, whether metal, wood, leather, glafs, horn, paper, fruits, fhells, or kernels, which have currency as a medium in *COMMERCE*. *Coin* is a particular fpecies, always made of metal, and ftruck according to a certain procefs called *COINING*.

The precise epocha of the invention of money is too ancient for our annals; and, if we might argue from the neceffity and obviousnefs of the thing, muft be nearly coeval with the world.

Whether *coins* be of equal antiquity, may admit of fome doubt; efpecially as moft of the ancient writers are fo frequent and exprefs in their mention of leathern-moneys, paper-moneys, wooden-moneys, &c. Some, however, notwithstanding this, are of opinion, that the firft moneys were of metal: the reafons they give, are the firmnefs, neatnefs, cleanlinefs, durability, and univerfality of metals; which, however, do rather conclude they ought to have been fo, than that they actually were fo.

In effect, the very commodities themfelves were the firft moneys, *i. e.* were current for one another by way of exchange; and it was the difficulty of cutting or dividing certain commodities, and the impoffibility of doing it without great lofs, that firft put men on the expedient of a general medium. See *EXCHANGE*.

Indeed, thus much may be faid in behalf of *coins*, that, on this view, it was natural for men to have their firft recourfe to metals; as being almoft the only things whole goodnefs, and as it were integrity, is not diminiſhed by partition; befides the advantages above expreffed, and the conveniencies of melting and returning them into a maſs of any fize or weight.

It was probably, then, this property of metals which firft accuſtomed people, who trafficked together, to account them in lieu of quantities of other merchandizes in their exchanges, and at length to ſubſtitute them wholly in their ſtead; and thus aroſe money: as it was their other property to preferve any mark or impreſſion a long time, which confirmed them in the right; and thus was the firſt riſe of *coins*. See *METAL*.

In the firſt ages, each perſon cut his metal into pieces of different fizes and forms, according to the quantity to be given for any merchandize, or according to the demand of the ſeller, or the quantity ſtipu-

lated between them. To this end they went to market laden with metal in proportion to the purchaſe to be made, and furniſhed with inſtruments for portioning it, and ſcales for dealing it out, according as occaſion required. By degrees, it was found more commodious to have pieces ready weighed; and as there were different weights required according to the value of the different wares, all thoſe of the ſame weight began to be diſtinguiſhed with the ſame mark or figure: thus were coins carried one ſtep further. At length the growing commerce of money beginning to be diſturbed with frauds, both in the weights and the matter, the public authority interpoſed; and hence the firſt ſtamps or impreſſions of money; to which ſucceeded the names of the monies; and at length the effigy of the prince, the date, legend, and other precautions to prevent the alterations of the ſpecies; and thus were coins completed.

Modern COINS. In England the current ſpecies of gold are the guinea, half-guinea, Jacobus, laureat, angel, and roſe-noble: the four laſt of which are now ſeldom to be met with; having been moſt of them converted into guineas, chiefly during the reign of Charles II. and James II. The ſilver coins are the crown, half-crown, ſhilling, and fixpence. Copper coins are the half-penny and farthing.

In Scotland, by the articles of the Union, it is appointed that all the coins be reduced to the Engliſh, and the ſame accounts obſerved throughout. Till then the Scots had their pounds, ſhillings, and pence, as in England; but their pound was but 20 pence Engliſh, and the others in proportion: accordingly, their merk was 13½ s. Scots, current in England at 13½ d. their noble in proportion. Beſides theſe they had their turner-pence and half-pence; their penny ⅔ of that of England: beſides baſe money of achiſons, babees, and placks. The bodle ⅓ of the penny, ⅓ of the achiſon, ⅓ of the babee, and ⅓ of the plack.

In Ireland, the coins are as in England, *viz.* ſhillings, pence, &c. with this difference, that their ſhilling or harper is but equal to nine pence ſterling; whence their pound is only ⅔ of ours, or 15 s.

But, for a view of all the coins preſently current in the four quarters of the globe, with their values and proportions, ſee the *Table* ſubjoined to the article *MONEY*.

In many places ſhells are current for coins; particularly a ſmall white kind dug out of the ground in the Maldives, and ſome parts of America, called in the Indies *cowries*, or *coris*, on the coaſt of Africa *bonges*, and in America *porcelaines*; of which it takes a vaſt number to be equivalent in value to a penny. Of zimbis, another kind of ſhell current, particularly in the kingdoms of Angola and Congo, two thouſand make what the negroes call a *macoute*; which is no real money; for of this there is none in that part of Africa but a manner of reckoning: thus, two Flemiſh knives they eſteem a macoute; a copper-baſon two pounds weight, and 12 inches diameter, they reckon three macoutes; a ſulce 10, &c.

In ſome places fruits are current for coins. Of theſe there are three forts uſed; two in America, particularly among the Mexicans, which are the cacao and maize: the other in the Eaſt Indies, *viz.* almonds, brought

Coin.

brought thither from Lar, and growing in the deserts of Arabia. Of cacao is esteemed equivalent to a Spanish rial, or seven pence sterling. Maize has ceased to be a common money since the discovery of America by the Europeans. Almonds are chiefly used where the *cowries* are not current. As the year proves more or less favourable to this fruit, the value of the money is higher or lower. In a common year 40 almonds are set against a *peſcha*, or half-penny sterling; which brings each almond to $\frac{1}{40}$ of a farthing.

Ancient Coins are those chiefly which have been current among the Jews, Greeks, and Romans. Their values and proportions are as follows.

JEWISH.			<i>l. s. d. ster.</i>
Gerah	—	—	00 : 00 : 1
1 Bekah	—	—	00 : 00 : 1
2 Shekel	—	—	00 : 00 : 2
1200 120 50	Maneh	} Minah hebraica	05 : 14 : 0
6000 600 3000 6	Talent		342 : 03 : 9
Solidus aureus, or sextula, worth	—	—	00 : 12 : 0
Siclus aureus, worth	—	—	1 : 16 : 6
A talent of gold, worth	—	—	5475 : 00 : 0

GRECIAN.			<i>s. d. grs. ster.</i>
Lepton	—	—	0 : 0 : 0
7 Chaleus	—	—	0 : 0 : 0
14 Dichaleus	—	—	0 : 0 : 1
28 4	Triobolium	—	0 : 0 : 2
56 8	Tetrobolium	—	0 : 0 : 4
112 16 8	Diobolium	—	0 : 0 : 8
224 32 16 8	Tetrobolium	—	0 : 0 : 16
336 48 24 12 6	Drachma	—	0 : 7 : 3
664 96 48 24 12 6 3	Didrachm	—	1 : 3 : 2
1328 192 96 48 24 12 6 3	Tetradrachm	—	2 : 7 : 0
1664 384 192 96 48 24 12 6 3	Pentrad.	—	3 : 2 : 3

Note. Of these the drachma, didrachm, &c. were of silver, the rest for the most part of brass. The other parts, as tridrachm, triobolus, &c. were sometimes coined.

Note also, the drachma is here, with the generality of authors, supposed equal to the denarius: though there is reason to believe, that the drachma was somewhat the weightier. See DRACHMA, and DENARIUS.

The Grecian gold coin was the stater aureus, weighing two attic drachms, or half of the stater argenteus; and exchanging usually for 25 attic drachms of silver; in our money

According to our proportion of gold to silver

There were likewise the stater cyzicenus, exchanging for 28 attic drachms, or

Stater philippicus, and stater alexandrinus, of the same value.

Stater daricus, according to Josephus, worth 50 attic drachms, or

Stater cræsius, of the same value.

ROMAN.

s. d. grs. Sterl.

Coin.

Teruncius	—	—	0 : 0 : 0
2 Semilibella	—	—	0 : 0 : 1
4 Libella	—	—	0 : 0 : 2
As	—	—	0 : 0 : 3
10 5 2	Sestertius	—	0 : 1 : 3
20 10 5 2	Quinarius	—	0 : 3 : 3
40 20 10 5 2	Victoriatius	—	0 : 7 : 3
40 20 10 5 2	Denarius	—	0 : 7 : 3

Notes. Of these the denarius, victoriatius, sestertius, and some times the as, were of silver, the rest of brass. See As, &c.

There were sometimes also coined of brass the triens, sextans, uncia, sextula, and dupondius.

The Roman gold coin was the aureus, which weighed generally double the denarius; the value of which, according to the first proportion of coinage, mentioned by Pliny, was

According to the proportion that obtains now amongst us, worth

According to the decuple proportion, mentioned by Livy and Julius Pollux, worth

According to the proportion mentioned by Tacitus, and which afterwards obtained, whereby the aureus exchanged for 25 denarii, its value

COIN, in architecture, a kind of dye cut diagonal-wise, after the manner of a flight of a stair-case, serving at bottom to support columns in a level, and at top to correct the inclination of an entablature supporting a vault.

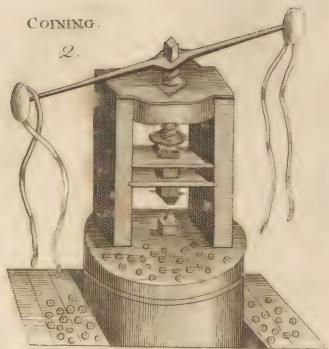
COIN is also used for a solid angle composed of two surfaces inclined towards each other, whether that angle be exterior, as the coin of a wall, a tree, &c. or interior, as the coin of a chamber or chimney. See QUOIN.

COINAGE, or COINING, the art of making money, as performed either by the hammer or mill.

Formerly the fabric of coins was different from what it is at present. They cut a large plate of metal into several little squares, the corners of which were cut off with sheers. After having shaped these pieces, so as to render them perfectly conformable, in point of weight, to the standard piece, they took each piece in hand again, to make it exactly round, by a gentle hammering. This was called a planchet, and was fit for immediate coining. Then engravers prepared, as they still do, a couple of steel mallets in form of dyes, cut and terminated by a flat surface, rounded off at the edges. They engraved or stamped on it the hollow of a head, a cross, a scutcheon, or any other figure, according to the custom of the times, with a short legend. As one of these dyes was to remain dormant, and the other moveable, the former ended in a square prism, that it might be introduced into the square hole of the block, which, being fixed very fast,

kept





CHRONOMETERS

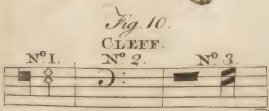
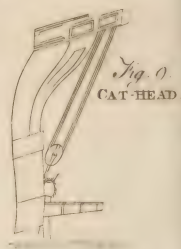
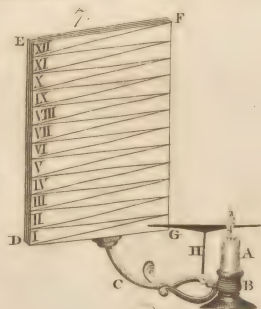
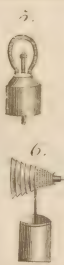
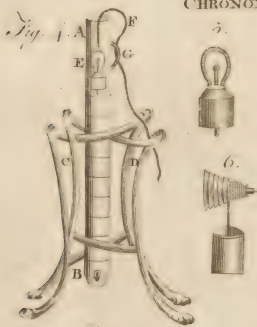
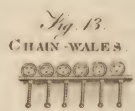


Fig. 12. CROW FOOT.



ANCIENT CROWNS



A Bell's scalp!

kept the dye as steady as any vice could have done. The planchet of metal was horizontally laid upon this inferior mafs, to receive the ftamp of it on one fide, and that of the upper dye, wherewith it was covered, on the other. This moveable dye, having its round engraved furface refting upon the planchet, had at its oppofite extremity a flat fquare, and larger furface, upon which they gave feveral heavy blows, with a hammer of an enormous fize, till the double ftamp was fufficiently, in relievo, impreffed on each fide of the planchet. This being finifhed, was immediately fucceeded by another, and they thus became a ftandard coin, which had the degree of finenefs the weight and mark determined by the judgment of the infpectors, to make it good current money. The ftiong tempering which was and is ftill given to the two dyes, rendered them capable of bearing thofe repeated blows. Coining has been confiderably improved and rendered expeditious, by feveral ingenious machines, and by a wife application of the beft physical experiments to the methods of fining, dyeing, and ftamping the different metals.

The three fineft inftruments the mint-man ufes, are the laminating engine; the machine for making the impreffions on the edges of coins; and the mill.

After they have taken the laminæ, or plates of metal, out of the mould into which they are caft, they do not beat them on the anvil, as was formerly done, but they make them pafs and repafs between the feveral rollers of the laminating engine, which being gradually brought clofer and clofer to each other, preftently give the laminæ its uniform and exact thicknefs. Inftead of dividing the laminæ into fmall fquares, they at once cut clean out of it as many planchets as it can contain, by means of a fharp fteel trepan, of a roundifh figure, hollow within, and of a proportionable diameter, to fhape and cut off the piece at one and the fame time. After thefe planchets have been prepared and weighed with ftandard pieces, filed or fcraped to get off the fuperfluous part of the metal, and then boiled and made clean, they arrive, at laft, at the machine, (fig. 1.), which marks them upon the edge; and finally, the mill, (fig. 2.) which fqueezing each of them fingly between the two dyes, brought near each other with one blow, forces the two furfaces or fields of the piece to fill exactly all the vacancies of the two figures engraved hollow. The engine which ferves to laminate lead, gives a fufficient notion of that which ferves to flatten gold and filver laminæ between rollers of a leffer fize. See LAMINATING.

The principal pieces of the machine, (fig. 1.), to ftamp coins on the edge, are two fteel laminæ, about a line thick. One half of the legend, or of the ring, is engraved on the thicknefs of one of the laminæ, and the other half on the thicknefs of the other; and thefe two laminæ are ftaight, although the planchet marked with them be circular.

When they ftamp a planchet, they firft put it between the laminæ in fuch a manner, as that thefe being each of them laid flat upon a copper-plate, which is fattened upon a very thick wooden table, and the planchet being likewife laid flat upon the fame plate, the edge of the planchet may touch the two laminæ on each fide, and in their thick part.

One of thefe laminæ is immovable, and fattened with feveral fcrews; the other fides by means of a dented wheel, which takes into the teeth that are on the furface of the laminæ. This fiding laminæ makes the planchet turn in fuch a manner, that it remains ftamped on the edge, when it has made one turn. Only crown and half-crown pieces can bear the impreffion of letters on the thicknefs of their edges.

The coining engine or mill is fo handy, (fig. 2.), that a fingle man may ftamp twenty thoufand planchets in one day: gold, filver, and copper planchets, are all of them coined with a mill, to which the coining fquares, (fig. 3.) commonly called dyes, are fattened; that of the face under, in a fquare box garnifhed with male and female fcrews, to fix and keep it ftady; and the other above, in a little box garnifhed with the fame fcrews, to fatten the coining fquare. The planchet is laid flat on the fquare of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which caufes the fcrew fet within it to turn. This enters into the female fcrew, which is in the body of the mill, and turns with fo much ftrength, that by pulling the upper fquare upon that of the effigy, the planchet, violently preffed between both fquares, receives the impreffion of both at one pull, and in the twinkling of an eye.

The planchet thus ftamped and coined, goes through a final examination of the mint wardens, from whole hands it goes into the world.

In the COINING of Medals, the procefs is the fame, in effect, with that of money; the principal difference confifting in this, that money having but a fmall relievo, receives its impreffion at a fingle ftroke of the engine; whereas for medals, the height of their relievo makes it neceffary that the ftroke be repeated feveral times: to this end the piece is taken out from between the dyes, heated, and returned again; which procefs in medallions and large medals, is repeated fifteen or twenty times before the full impreffion be given, care muft be taken, every time the planchet is removed, to take off the fuperfluous metal ftretched beyond the circumference with a file. Medallions, and medals of a high relievo, are ufually firft caft in fand, by reafon of the difficulty of ftamping them in the prels, where they are put only to perfect them; in regard the fand does not leave them clear, fmooth, and accurate enough. Therefore we may fee that medals receive their form and impreffion by degrees, whereas money receives them all at once.

BRITISH COINAGE, both by the beauty of the engraving, and by the invention of the impreffions on the edges, that admirable expedient for preventing the alteration of the fpecies, is carried to the utmoft perfection.

It was only in the reign of king William III. that the hammer-money ceafed to be current in England, where till then it was ftuck in that manner, as in other nations. Before the hammer fpecies was called in, the Englifh money was in a wretched condition, having been filed and clipped by natives as well as foreigners, infomuch that it was fcarce left of half the value: the retrieving this diftreffed ftate of the Englifh money is looked upon as one of the glories of king William's reign.

The

The British coinage is now wholly performed in the Tower of London, where there is a corporation for it, under the title of the mint. Formerly there were here, as there are still in other countries, the rights of seignorage and brassage: but since the eighteenth year of king Charles the Second, there is nothing taken either for the king, or for the expences of coining; so that weight is returned for weight, to any person who carries their gold and silver to the Tower.

The species coined in Great Britain are esteemed contraband goods, and not to be exported. All foreign species are allowed to be sent out of the realm, as well as gold and silver in bars, ingots, dust, &c.

Barbary COINAGE, particularly that of Fez and Tunis is under no proper regulations, as every goldsmith, Jew, or even private person, undertakes it at pleasure; which practice renders their money exceedingly bad, and their commerce very unsafe.

Muscovite COINAGE. In Muscovy there is no other coin struck but silver, and that only in the cities of Moscow, Novogrod, Twere, and Pleskow, to which may be added Peterburgh. The coinage of each of these cities is let out to farm, and makes part of the royal revenue.

Persian COINAGE. All the money made in Persia is struck with a hammer, as is that of the rest of Asia: and the same may be understood of America, and the coasts of Africa, and even Muscovy: the king's duty, in Persia, is seven and a half *per cent.* for all the moneys coined, which are lately reduced to silver and copper, there being no gold coin there, except a kind of medals, at the accession of a new sopher.

Spanish COINAGE is esteemed one of the least perfect in Europe. It is settled at Seville and Segovia, the only cities where gold and silver are struck.

COIRE, or, as the Germans call it, *CHUR*, a large and handsome town of Switzerland, and capital of the country of the Grisons, with a bishop's see whose prelate has the right of coining money. It is divided into two parts; the least of which is of the Roman Catholic religion, and the greatest of the Protestant. It is governed by its own laws, and seated in a plain, abounding in vineyards and game, on the river Pfersure, half a mile from the Rhine. E. Long. 9. 27. N. Lat. 46. 50.

COITION, the intercourse between male and female in the act of generation. See *GENERATION*, and *CONGRESS*.

It is observed that frogs are forty days in the act of *coition*. Bartholine, &c. relate, that butterflies make 130 vibrations of the wings in one act of *coition*.

COIX, *JON'S TEARS*; a genus of the triandria order, belonging to the monœcia class of plants. Of this there is but one species, a native of the Archipelago islands, and frequently cultivated in Spain and Portugal, and also in the West Indies. It is an annual plant, rising from a fibrous root, with two or three jointed stalks, to the height of two feet, with single, long, narrow leaves at each joint, resembling those of the reed; at the base of the leaves come out the spikes of flowers standing on short foot-stalks; the seeds greatly resemble those of Gromwell; whence the plant has by some writers been called *Lithospermum*. This plant may be propagated in this country by seeds

brought from Portugal, and sown on a hot-bed; after which the young plants are to be removed into a warm border, and planted at the distance of two feet at least from each other. They will require no other care than to be kept free from weeds. In Spain and Portugal the poor people grind the seeds of this plant, in times of scarcity, and make a coarse kind of bread of them. The seeds are inclosed in small capules about the bigness of an English pea, and of different colours. These are strung upon silk, and used instead of bracelets by some of the poorer sort in the West Indies, but especially by the negroes.

COKE, or *COOKE* (Sir Edward), lord chief justice of the king's bench in the reign of James I. was descended from an ancient family in Norfolk, and born at Milham in 1549. When he was a student in the Inner-Temple, the first occasion of his distinguishing himself was his stating the case of a cook belonging to the Temple so exactly, that all the house, who were puzzled with it, admired him and his pleading, and the whole bench took notice of him. After his marriage with a lady of a great fortune, preferments flowed in upon him. The cities of Norwich and Coventry chose him for their recorder; the county of Norfolk, for one of their knights in parliament; and the house of commons, for their speaker, in the 35th year of queen Elizabeth. The queen appointed him solicitor-general in 1592, and attorney-general the next year. In 1603, he was knighted by king James I.; and in November the same year, upon the trial of Sir Walter Raleigh, &c. at Winchester, he treated that gentleman with a scurrility of language hardly to be paralleled. June 27, he was appointed lord chief justice of the common pleas; and in 1613, lord chief justice of the king's bench, and sworn one of the privy council. In 1615, he was very vigorous in the discovery and prosecution of the persons employed in poisoning Sir Thomas Overbury in the Tower in 1612. His contest not long after with the lord chancellor Egerton, with some other cases, hastened the ruin of his interest at court: so that he was sequestered from the council-table and the office of lord chief justice. In 1621, he vigorously maintained in the house of commons, that no proclamation is of any force against the parliament. The same year, being looked upon as one of the great incendiaries in the house of commons, he was removed from the council of state with disgrace; the king saying, that "he was the fittest instrument for a tyrant that ever was in England;" he was also committed to the Tower, and his papers were seized. Upon the calling of a new parliament in 1625, the court-party, to prevent his being elected a member, got him appointed sheriff of Buckinghamshire; to avoid the office, if possible, he drew up exceptions against the oath of a sheriff, but was obliged to undertake the office. In 1628, he spoke vigorously upon grievances; and made a speech in which he affirmed, that "the duke of Buckingham was the cause of all our miseries." While he lay upon his death-bed, his papers and last will were seized by an order of council. He died in 1634, and published many works: the most remarkable are his Institutes of the laws of England; the first part of which is only a translation and comment of Sir Thomas Littleton, one of the

Cokenhausen
|
Colchicum.

Colcothar
|
Cold.

the chief justices of the common pleas in the reign of Edward IV.

COKENHAUSEN, a strong town of Livonia in Sweden, on the river Divina. E. Long. 24. 56. N. Lat. 56. 40.

COL, a name given by some to one of the western islands of Scotland; it abounds in corn, pasture, salmon, eels, and cod. W. Long. 7. 35. N. Lat. 57. 8.

COLBERG, a strong, handsome sea-port town of Germany, in Pomerania, belonging to the king of Prussia. It is remarkable for its salt-works; and is seated at the mouth of the river Perant, on the Baltic-sea, 60 miles north-east of Stetin, and 30 north-east of Camin. E. Long. 15. 57. N. Lat. 54. 18.

COLBERT (John Baptiste), marquis of Signelai, reputed the greatest statesman France ever produced. He was prime minister to Lewis XIV. and was equally renowned in every department of his extensive administration. The polite arts, commerce, and manufactures, stood indebted to him for some signal advantage every year of his ministry. His attention to the marine service was no less conspicuous; for he built arsenals at Marseilles, Toulon, Brest and Rochfort, which he kept well provided with naval and military stores. The regulations he effected in the courts of judicature, and in the finances, completed his character, and rendered it much more renowned than that of Sully, because his views were more extensive. He died in 1683, aged 64. The house of Colbert has produced several eminent men in the church, the army, and the cabinet of France.

COLCHESTER, the capital of the county of Essex in England. It is by some thought to be the place mentioned by Antoninus under the name of *Colonia*, different from Colonia Camaloduni, and by the Saxons called *Cæsar Colin*. It is a beautiful, populous, and pleasant town, extended on the brow of a hill from east to west, and adorned with 10 churches. It had formerly strong walls and a castle, but now there are scarce any remains of either. This place is said to have given birth to Fl. Julia Helena, mother to Constantine the Great, and daughter to king Coelus, so much celebrated for her piety and zeal in propagating the Christian religion. Here, and in the neighbouring towns, is a great manufacture of hays and fays. It is also famous for its oysters; in pickling and barrelling which, the inhabitants excel. The rendering navigable the river Coln, on which the town stands, has greatly promoted its trade and manufactures. The town had formerly an abbey whose abbot was mitred and sat in parliament. In the time of the civil wars it was besieged by the parliament's troops and reduced by famine. It was formerly a corporation, but lately lost its charter for some misdemeanor; however, it still sends two members to parliament. E. Long. 1. 2. N. Lat. 51. 55.

COLCHICUM, MEADOW-SAFFRON; a genus of the trigynia order, belonging to the hexandria class of plants. There are three species, all of them bulbous-rooted, low, perennials, possessing the singular property of their leaves appearing at one time, and their flowers at another; the former rising long and narrow from the root in the spring, and decaying in June; the flowers, which are inopetalous, long, tubular,

erect, and six-parted, rise naked from the root in autumn, not more than four or five inches high. Their colours afford a beautiful variety; being purple, variegated purple, white, red, rose-coloured, yellow, &c. with single and double flowers. They are all hardy plants, inasmuch that they will flower though the roots happen to lie out of the ground; but by this they are much weakened. They are propagated by offsets from the roots of which they are very prolific. These are to be taken up and divided at the decay of the leaf in summer, planting the whole again before the middle of August. They are to be placed at nine inches distance from one another, and three inches deep in the ground.

The root of this plant is poisonous. When young and full of sap, its taste is very acid; but when old, mealy and faint. Two drachms of it killed a large dog in 13 hours, operating violently by stool, vomit, and urine. One grain of it swallowed by a healthy man, produced heats in the stomach, and soon after flushing heats in different parts of the body, with frequent shiverings, followed by colicky pains; after which an itching in the loins and urinary passages was perceived; then came on a continual inclination to make water, a tenesmus, pain in the head, quick pulse, thirst, and other disagreeable symptoms. Notwithstanding these effects, however, an infusion of the roots in vinegar, formed into a syrup with honey or sugar, proves a safe and powerful pectoral and diuretic, and is often of service in dropsies, &c. The virtues of colchicum seem much to resemble those of squills.

COLCOTHAR, the substance remaining after the distillation or calcination of martial vitriol by a violent fire. See **CHEMISTRY**, n° 112.

COLD, in a relative sense, generally signifies that sensation which accompanies the transition of the fine vessels of the human body from an expanded to a more contracted state. In an absolute sense, it means the agent by which that sensation is produced.

Concerning the cause of this sensation, which alone can be properly called *cold* in the abstract, philosophers are by no means agreed; some maintaining, that the term is merely relative, and owing only to the different degrees of *heat* contained in different bodies; others, that *cold* is as really and truly a substance as heat itself. The arguments on both sides may be stated as follows:

1. The sensation of cold may be produced without abstracting from the human body any part of its sensible heat; nay, from some observations made by the thermometer, it appears, that a violent degree of cold may be felt when the body is really *hotter* than usual. Examples of this occur in the cold fits of intermittents, and the chinefs which usually precedes fevers of all kinds.

2. The body may be so disposed, that the same substance may feel hot and cold to different parts of it. Thus, suppose a person has one hand cooled so as to sink Fahrenheit's thermometer to 60°, while the other raises it to 90; if both of them are now plunged into a vessel of water reduced to the temperature of 75°, this water will feel hot to one hand and cold to the other.

3. Though we see a visible spring and fountain of

Cold. heat, viz. the sun, who by his light diffuses warmth to the whole world, yet we perceive no such spring or origin of cold. The sun's preference always brings warmth; and of this warmth there is a very evident cause, viz. the light which is continually flowing from him: his absence is as certainly attended with cold; but for this cold we observe no positive cause. We see, that to produce the most intense cold nothing else than the mere privation of the sun's light is requisite. As therefore we have already seen that it is possible to produce different sensations of heat and cold, without varying the temperature of the substance by which they are produced, it seems most probable, that these sensations are the result of a mere negation, or want of that heat to which our bodies have been accustomed, or which is necessary to their subsistence.

In answer to the above, it hath been urged,

3
Answered. 1. The two first instances prove nothing. From them it only appears, that cold produces a contraction of the fine vessels of our bodies; and that, by whatever cause this contraction is produced, the same sensation always follows it: but whether this sensation is produced in all cases by a negative or a positive, can by no means be determined by such experiments.

2. The third argument proves by far too much: for if the mere absence of the sun's light and heat was sufficient to produce cold, then caves and other places that are never exposed to the sun, ought to be cold beyond all imagination. The contrary, however, is manifest to daily experience. At a certain depth below ground, an uniform temperature is observed, which scarce ever varies, provided a circulation of air is presented as much as possible. In some caverns indeed, such as those in Mount Atna, where the air circulates freely, the cold is very intense*.

* See *Ætius*.
4
Atmosphere, the source of cold. It would seem therefore, that as the sun is the origin and fountain of heat, so is our atmosphere the source from whence cold is derived; and that this atmosphere, or something in it, is as really and positively cold, as the light of the sun is really and positively heat. This will become the more probable when we consider, that the beams of the sun are not capable, as emitted from him, of heating the atmosphere. They must first be detained in it by reflection from the earth; and where this reflection cannot reach, as on the tops of very high mountains, an intense degree of cold is always found to take place. Again, even in those places where the cold is most intense, it is found only to affect the surface of the ground. This shews, that the cause of cold lies in the atmosphere, and not in the absence of the sun's light; otherwise, in those regions, however cold the surface was, the under parts of the soil must be much colder. We see, therefore, that there is in nature a positive source of cold as well as of heat; the atmosphere being the source of the one, as the sun is of the other: and these two always acting opposite to one another, contribute to preserve that exact balance which is necessary for the existence of the system of nature in the form we see it; and, were the one or the other finally to get the better, the whole world, or at least its inhabitants, must perish in a miserable manner.

It will scarce be denied, that, were the sun to cease the emission of his light for a few months, the most

intense and violent cold would by that time have taken place in the atmosphere. But, what has become of the immense quantity of heat and light emitted from the sun since the creation of the world? It is absorbed by terrestrial bodies, we know; but what becomes of it afterwards? The atmosphere perhaps takes it from terrestrial bodies: nay, indeed, there is here not the least doubt; for we know that exposure to the air is a very ready way to cool any thing. Still, however, the difficulty is not solved: for it is most certain, that, since the world was created, the earth and its atmosphere have received as much heat from the sun as would have been sufficient to have set them on fire a thousand times over; and seeing this hath not been done, we must necessarily conclude, either that heat, after some time, ceases to be heat, or that there is in nature a power able to countermand or suspend its effects; and that this power, though invisible as heat itself is, must be really and truly a positive substance, and is that which we commonly call cold.

The first of these positions, viz. that heat, after some time, ceases to be heat, is contrary to all experience. It is certain, that no body whatever loses its heat but by communicating it to others. Were there not, therefore, an opposite principle in nature, the quantity of heat accumulated in terrestrial bodies must have been continually increasing; and, as already observed, would long since have destroyed the whole world. By supposing, however, a cold principle as well as a hot one, the difficulty entirely vanishes. On this supposition it is impossible that a quantity of heat can enter any substance without expelling an equal quantity of cold from it. When the cause producing the heat is removed, the cold then re-enters and displaces the heat, and so on.

5
3. That cold is a positive principle is not a mere hypothesis, but may be ascertained by experiment. From what we have just now said it follows, that if a body is heated, the cold ought to fly from it, and, attacking those substances in the vicinity of the heated body, make them colder than before. To this purpose we have an experiment recorded in the philosophical Transactions, n^o 274, p. 951. It was made by M. Geoffroy. "I put (says he) some cold water into a great basin. I put into the middle of the water a cucurbit of glass full of water equally cold. I put into the cucurbit a very good thermometer, which I let lie a good while for a trial. When it was adjusted to a degree proportionable to the cold of the water, I threw suddenly into the water in the basin four or five shovels full of coals well lighted; and in an instant the liquor of the thermometer descended two or three lines. After some moments the liquor rose again, when the heat in the water of the basin was communicated to the glass."

These are the principal arguments that have been urged *pro* and *con* in this question. The last mentioned experiment, if it can be depended on, seems to be decisive in favours of those who assert cold to be a positive substance. But however philosophers may decide this question, we believe the generality of mankind will always take it for granted that cold is a substance as well as heat.

Among those who allow cold to be a substance, there

Cold.

Experiment, proving cold to be a positive substance.

Cold. 6 Con- jec- tures con- cerning the substance of cold.	there is no small disagreement about what sort of substance it is. Some have supposed it to consist in certain nitrous or saline particles diffused through the atmosphere; others attribute cold to the action of the electric fluid. The first hypothesis is evidently false; for if such saline particles existed, it is impossible but they must on some occasions discover themselves, which they are never known to do. Concerning the latter, no experiments either have been or probably can be made; because every experiment in electricity we can make is only throwing the fluid into some kind of motion, in which case it would be more apt to produce heat than cold. It is observable, however, that the radiell conductors of the electric fluid are likewise the best conductors of heat and cold; and <i>vice versa</i> . Thus, metals, which are the best conductors of electricity, also transmit heat or cold very readily through them: whereas wool, hair, silk, &c. which will not conduct this fluid, are found to be the best preservatives against excesses of heat or cold. See ELECTRICITY.	fions of spirit of salt on pounded ice sunk it 14 th below 0; but by repeated affusions of spirit of nitre, Mr Fahrenheit sunk it to 40 th below 0; and the spirit of nitre itself though very strong was then frozen. Even these excessive degrees of cold are naturally produced by the atmosphere in some parts of the world. In 1708 Mr Derham acquaints us that his thermometer was within one tenth of an inch of its station when plunged into a mixture of snow and salt. In 1732, the thermometer at Peterburgh stood at 28 th below 0. In 1737, when the French academicians wintered at the north polar circle or near it, the thermometer sunk 33 th below 0. The spirit of wine with which some of their thermometers were filled was then frozen; the air, when suddenly admitted into their warm rooms, became intolerable to their bodies, their breasts seemed to be rent when they breathed it, and the moisture of the air was immediately converted into whirls of snow. In this degree of cold every metallic substance, when touched, blistered the skin like red-hot iron. This, however, is but trifling in comparison of what hath been observed at a place in Siberia, lying in Lat. 58. 10. where the thermometer fell to 118 th below 0; nay, by some late accounts from that country, we are informed, that the cold hath been observed there of such a strength as to freeze the quicksilver in the thermometers. When Mr Brown first made this famous experiment of freezing quicksilver, the thermometer at Petersburg stood at 40 th below 0. By repeated affusions of spirit of nitre on snow, he made it sink 108 degrees lower; after which the cold became immeasurable, because the quicksilver was frozen. But for a particular account of this experiment, see the article CONGELATION. Very great degrees of cold also may be produced by evaporation; for a particular account and explanation of which, see the article EVAPORATION.	Cold Coldinguen 8 Excessive degrees of natural cold.
7 Cold pro- duced arti- ficially by means of salts.	Most kinds of saline substances mixed with water make the mixture considerably colder than either the salt or the water was before. In the paper quoted above, Mr Geoffroy gives an account of several experiments with regard to this power of the salts to produce cold. Four ounces of sal ammoniac, mixed with a pint of common water, made his thermometer descend two inches and nine lines below the temperature of the water, in less than a quarter of an hour. An ounce of the same salt, put into four or five ounces of distilled vinegar, made the liquor descend two inches and three lines. Half an ounce of sal ammoniac, mixed with three ounces of spirit of nitre, made the thermometer descend two inches and five lines; but on using spirit of vitriol instead of that of nitre, it sunk three inches and six lines; and what is very remarkable, though this mixture was so extremely cold, the vapours raised by it had a considerable degree of heat. Four ounces of saltpetre mixed with a pint of water, sunk the thermometer one inch three lines; but a like quantity of sea-salt sunk it only two lines. With acids, even with its own spirit, sea-salt produced a considerable heat. Volatile alkaline salts produced cold in proportion to their purity; but fixed alkalies, heat. The greatest degree of cold, however, as yet produced by mixtures of this kind, was shewn by Mr Homburg; and the experiment may be performed as follows. "Take a pound of corrosive sublimate, and as much sal ammoniac; powder them separately, and mix both the powders very exactly; put the mixture into a vial, pouring upon it a pint and a half of distilled vinegar, and shake all well together. This composition grows so cold that a man can scarce hold it in his hands in summer. And it happened, as Mr Homburg was making the experiment, that the subject froze." This also once happened to M. Geoffroy with common water and sal ammoniac; but he says he never could make the experiment succeed again.	COLD, in medicine. See (the <i>Index</i> subjoined to) MEDICINE.	COLD, in farriery. See there, § iii. COLDENIA, a genus of the tetragynia order, belonging to the tetrandria class of plants. There is but one species, a native of India. It is an annual plant, whose branches trail on the ground, extending about six inches from the root. They are adorned with small blue flowers growing in clusters, which come out from the wings of the leaves. They are propagated by seeds sown on a hot-bed; when the plants come up, they may be removed each into a separate pot, and plunged into a hot-bed of tanner's bark, where they are to remain constantly.
	If instead of making these experiments with water in its fluid state, we take it when converted into ice or rather snow, incredible degrees of cold may be produced. A mixture of snow and common salt sinks Fahrenheit's thermometer to 0. If pot-ashes are mixed with powdered ice, it sinks 8 th farther. Two affu-	COLDINGHAM, a barren heathy moor on the borders of Scotland. It is only remarkable for a convent formerly filled with most heroic nuns; who, to preserve themselves inviolate from the Danes, cut off their lips and noses; and thus rendering themselves objects of horror, were, with their abbess Ebba, in 870, burnt in the monastery by the disappointed savages.	COLDINGUEN, a town of Denmark, in North Jutland, and diocese of Ripen. It is remarkable for its bridge, over which pass all the oxen and other cattle that go from Jutland into Germany, which brings in a considerable revenue to the king. It is seated on

an eminence, in a pleasant country abounding with game. E. Long. 9. 25. N. Lat. 55. 35.

COLD-FINCH, a species of MOTACILLA.

COLD-SHIRE IRON, that which is brittle when cold.

COLE (William), the most famous botanist of his time, was born at Adderbury in Oxfordshire, about the year 1626, and studied at Merton college in Oxford. He at length removed to Putney, near London; and published "The Art of Simpling; and Adam in Eden, or Nature's Paradise." Upon the restoration of king Charles II. he was made secretary to Dr Duppa, bishop of Winchester; but died two years after, aged 37.

COLE-FISH, a species of GADUS.

COLE-Seed, the seed of the *napus sativa*, or long-rooted, narrow-leaved rapa, called in English *navew*, and reckoned by Linnaeus among the brassicas, or cabbage-kind. See BRASSICA.

This plant is cultivated to great advantage in many parts of England, on account of the rape oil expressed from its seeds. The practice of sowing it was first introduced by those Germans and Dutchmen who drained the fens of Lincolnshire; and hence the notion hath generally prevailed, that it will thrive only in a marshy soil, but this is now found to be a mistake. In preparing the land which is to receive it, care must be taken to plow it in May, and again about midsummer, making the ground as fine and even as possible. It is to be sown the very day of the last plowing, about a gallon on an acre. In the months of January, February, and March, it affords very good food for cattle, and will sprout again when cut; after which it is excellent nourishment for sheep. After all, if it is not too closely fed, it will bear seed against next July. The same caution, however, is requisite with this food as with clover, till cattle are accustomed to it, otherwise it is apt to swell them. When this plant is cultivated solely with a view to the seed, it must be sown on deep strong land without dung, and must be suffered to stand till one half of the seeds at least are turned brown; which, according to the seasons, will be sometimes sooner sometimes later. In this state it is to be cut in the same manner and with the same care as wheat; and every handful as it is cut is to be regularly ranged on sheets, that it may dry leisurely in the sun, which will commonly be in a fortnight; after which it is to be carefully threshed out, and carried to the mill for expressing the oil. The produce of cole-feed is generally from five to eight quarters on an acre; and is commonly sold at 20s. per quarter.

COLEOPTERA, or BEETLE, the name of Linnaeus's first order of insects. See ZOOLOGY.

COLEWORT. See BRASSICA.

COLERAIN, a large town of Ireland, in the county of Londonderry and province of Ulster; seated on the river Bann, in W. Long. 7. 2. N. Lat. 55. 10.

COLES (Elitha), author of the well known Latin and English dictionary, was born in Northamptonshire about the year 1640; and was entered of Magdalene College Oxford, which he left without taking a degree; and taught Latin to young people, and English to foreigners, in London, about the year 1663. He

afterwards became an usher in Merchant-taylor's school; but for some great fault, nowhere expressly mentioned, he was forced to withdraw to Ireland, from whence he never returned. He was, however, a good critic in the English and Latin tongues; and wrote several useful books of instruction in his profession.

COLET (John), dean of St Paul's, the son of Henry Colet knight, was born in London in the year 1466. His education began in St Anthony's school in that city; from whence, in 1483, he was sent to Oxford, and probably to Magdalene college. After 7 years study of logic and philosophy, he took his degrees in arts. About the year 1493, Mr Colet went to Paris, and thence to Italy, probably with a design to improve himself in the Greek and Latin languages, which at this time were imperfectly taught in our universities. On his return to England in 1497, he took orders; and returned to Oxford, where he read lectures gratis, on the epistles of St Paul. At this time he possessed the rectory of Dennington in Suffolk, to which he had been instituted at the age of 19. He was also prebendary of York, and canon of St Martin's le Grand in London. In 1502, he became prebendary of Sarum; prebendary of St Paul's, in 1505; and immediately after, dean of that cathedral, having previously taken the degree of doctor of divinity. He was no sooner raised to this dignity, than he introduced the practice of preaching and expounding the Scriptures; and soon after established a perpetual divinity lecture in St Paul's church, three days in every week; an institution which gradually made way for the reformation. About the year 1508, dean Colet formed his plan for the foundation of St Paul's school, which he completed in 1512, and endowed with estates to the amount of 122 l. and upwards. The celebrated grammarian, William Lilye, was his first master, and the company of mercers were appointed trustees. The dean's notions of religion were so much more rational than those of his cotemporary priests, that they deemed him little better than a heretic; and on that account he was so frequently molested, that he at last determined to spend the rest of his days in peaceful retirement. With this intention he built a house near the palace at Richmond; but, being seized with the sweating sickness, he died in 1519, in the 52^d year of his age. He was buried on the south side of the choir of St Paul's; and a stone was laid over his grave, with no other inscription than his name. Besides the preferments above-mentioned, he was rector of the guild of Jesus at St Paul's, and chaplain to king Henry VIII. Dean Colet, though a papist, was an enemy to the gross superstitions of the church of Rome. He disapproved auricular confession, the celibacy of the priests, and such other ridiculous tenets and ceremonies as have ever been condemned by men of sound understanding in every age and country. He wrote 1. Rudimenta grammatices. 2. The construction of the eight parts of speech. 3. Daily devotions. 4. Epistolæ ad Erasmus. 5. Several sermons; and other works which still remain in manuscript.

COLIAS, in ichthyology. See COMBER.

COLIC, a severe pain in the lower venter, so called because the colon was formerly supposed to be the part

part affected. See (*the Index subjoined to*) MEDICINE.

COLIC, in farriery. See there, § xiii.

COLIGNI (Gaspard de), admiral of France, was born in 1516. He signalized himself in his youth, in the reigns of Francis I. and Henry II. and was made colonel of infantry and admiral of France in 1552. Henry II. employed him in the most important affairs; but after the death of that prince he embraced the reformed religion, and became the chief of the Protestant party: he strongly opposed the house of Guise, and rendered this opposition so powerful, that it was thought he would have overturned the French government. On the peace made after the battles of Jarnac and Montcontour, Charles IX. deluded Coligni into security by his deceitful favours; and though he recovered one attempt on his life, when he attended the nuptials of the prince of Navarre, yet he was included in the dreadful massacre of the Protestants on St Bartholomew's-day 1572, and his body treated with wanton brutality by a misguided Popish populace.

COLIR, an officer in China, who may properly be called an inspector, having an eye over what passes in every court or tribunal of the empire.

In order to render him impartial, he is kept independent, by having his post for life. The power of the collirs is such, that they make even the princes of the blood tremble.

COLIMA, a sea-port town of Mexico in North America, and capital of a fertile valley, of the same name. It is seated at the mouth of a river in W. Long. 109.6. N. Lat. 18.30.

COLIOURE, a small, but ancient and strong town of France, in Roussillon, seated at the foot of the Pyrenean mountains, with a small harbour. E. Long. 3.10. N. Lat. 43.24.

COLISEUM, in ancient architecture, an oval amphitheatre at Rome, built by Vespasian, wherein were statues set up, representing all the provinces of the empire: in the middle whereof stood that of Rome, holding a golden apple in her hand. This structure was so large, that it would hold near 100,000 spectators.

COLITES, in natural history, a name given by some writers to a kind of pebble, found in the shape of the human penis and testes, and that either separately, or both together.

COLLAR, in Roman antiquity, a sort of chain put generally round the neck of slaves that had run away, after they were taken, with an inscription round it, intimating their being deserters, and requiring their being restored to their proper owners, &c.

COLLAR, in a more modern sense, an ornament consisting of a chain of gold, enamelled, frequently set with ciphers or other devices, with the badge of the order hanging at the bottom, wore by the knights of several military orders over their shoulders, on the mantle, and its figure drawn round their armories.

Thus, the collar of the order of the garter consists of S.S. with roses enamelled red, within a garter enamelled blue, and the George at the bottom.

Lord Mayor's COLLAR is more usually called chain. See CHAIN.

Knights of the COLLAR, a military order in the republic of Venice, called also the order of St Mark, or

the medal. It is the doge and the senate that confer this order; the knights bear no particular habit, only the collar, which the doge puts around their neck, with a medal, wherein is represented the winged lion of the republic.

COLLAR of a Draught-horse, a part of harness made of leather and canvas, and stuffed with straw or wool, to be put about the horse's neck.

COLLORAGE, a tax or fine laid for the collars of wine-drawing horses.

COLLATERAL, any thing, place, country, &c. situated by the side of another.

COLLATERAL, in genealogy, those relations which proceed from the same stock, but not in the same line of ascendants or descendants, but being, as it were, aside of each other. Thus, uncles, aunts, nephews, nieces and cousins, are collaterals, or in the same collateral line: those in a higher degree, and nearer the common root, represent a kind of paternity with regard to those more remote. See CONSANGUINITY.

COLLATERAL Succession. When a defunct, for want of heirs descended of himself, is succeeded in his estate by a brother or sister, or their descendants, the estate is said to have gone to collateral heirs.

COLLATION, in the canon law, the giving or bestowing of a benefice on a clergyman by a bishop, who has it in his own gift or patronage. It differs from institution in this, that institution is performed by the bishop, upon the presentation of another; and collation is his own act of presentation: and it differs from a common presentation, as it is the giving of the church to the person, and presentation is the giving or offering of the person to the church. But collation supplies the place of presentation and institution; and amounts to the same as institution where the bishop is both patron and ordinary. Anciently the right of presentation, to all churches, was in the bishop; and now if the patron neglects to present to a church, then this right returns to the bishop by collation: if the bishop neglects to collate within six months after the elapse of the patron, then the archbishop hath a right to do it; and if the archbishop neglects, then it devolves to the king; the one as superior, to supply the defects of bishops, the other as supreme, to supply all defects of government.

COLLATION, in common law, the comparison or presentation of a copy to its original, to see whether or not it be conformable; or the report or act of the officer who made the comparison. A collated act is equivalent to its original, provided all the parties concerned were present at the collation.

COLLATION, in Scots law, that right which an heir has of throwing the whole heritable and moveable estates of the deceased into one mass, and sharing it equally with the others in the same degree of kindred, when he thinks such share will be more than the value of the heritage to which he had an exclusive title.

COLLATION is also vulgarly used for a repast between dinner and supper.

COLLEAGUE, a partner or associate in the same office or magistrature. See ADJUNCT.

COLLECT, COLLECTION, a voluntary gathering of money, for some pious or charitable purpose. See ALMS, CHARITY, &c. Some say, the name collect,

Collect
College.

or *collection*, was used, by reason those gatherings were anciently made on the days of *collects*, and in *collects*, i. e. in assemblies of Christians; but, more probably, *quia collegiatur pecunia*.

COLLECT is sometimes also used for a tax, or imposition, raised by a prince for any pious design. Thus, historians say, that in 1166, the king of England, coming into Normandy, appointed a *collect* for the relief of the holy land, at the desire and after the example of the king of France. See **CROISADE**.

COLLECT, in the liturgy of the church of England, and the mass of the Romanists, denotes a prayer accommodated to any particular day, occasion, or the like. See **LITURGY**, and **MASS**.

In the general, all the prayers in each office are called *collects*; either because the priest speaks in the name of the whole assembly, whose sentiments and desires he sums up by the word *oremus*, "let us pray," as is observed by pope Innocent III. or, because those prayers are offered when the people are assembled together, which is the opinion of Pamelius on Tertulian.

The congregation itself is in some ancient authors called *collect*. The popes Geladius and Gregory are said to have been the first who established *collects*. Despençe, a doctor of the faculty of Paris, has an express treatise on *collects*, their origin, antiquity, authors, &c.

COLLECTIVE, among grammarians, a term applied to a noun expressing a multitude, though itself be only singular; as an army, company, troop, &c. called *collective nouns*.

COLLECTOR, in general, denotes a person who gets or brings together things formerly dispersed and separated. Hence,

COLLECTOR, in matters of civil polity, is a person appointed by the commissioners of any duty, the inhabitants of a parish, &c. to raise or gather any kind of tax.

COLLECTOR, among botanists, one who gets together as many plants as he can, without studying botany in a scientific manner.

COLLEGATORY, in the civil law, a person who has a legacy left him in common with one or more other persons.

COLLEGE, an assemblage of several bodies or societies, or of several persons into one society.

College, among the Romans, served indifferently for those employed in the offices of religion, of government, the liberal and even mechanical arts and trades; so that, with them, the word signified what we call a corporation or company.

Each of these colleges had distinct meeting-places or halls; and likewise, in imitation of the state, a treasury and common chest, a register, and one to represent them upon public occasions, and acts of government. These colleges had the privilege of manumitting slaves, of being legates, and making by-laws for their own body, provided they did not clash with those of the government.

There are various colleges on foot among the moderns, founded on the model of those of the ancients. Such are the three colleges of the empire, *viz.*

COLLEGE of Electors, or their Deputies, assembled in the diet of Ratisbon.

COLLEGE of Princes; the body of princes, or their deputies, at the diet of Ratisbon.

COLLEGE of Cities, is, in like manner, the body of deputies which the imperial cities send to the diet.

COLLEGE of Cardinals, or the **Sacred COLLEGE**; a body composed of the three orders of cardinals. See **CARDINALS**.

COLLEGE is also used for a public place endowed with certain revenues, where the several parts of learning are taught.

An assemblage of several of these colleges constitute an university. The erection of colleges is part of the royal prerogative, and not to be done without the king's licence.

The establishment of colleges or universities, is a remarkable period in literary history. The schools in cathedrals and monasteries confined themselves chiefly to the teaching of grammar. There were only one or two masters employed in that office. But, in colleges, professors are appointed to teach all the different parts of science. The first obscure mention of academical degrees in the university of Paris, (from which the other universities in Europe have borrowed most of their customs and institutions), occurs A. D. 1215.

COLLEGE of Civilians, commonly called *Doctors-commons*, founded by Dr Harvey, dean of the arches, for the professors of the civil law residing in the city of London. The judges of the arches, admiralty, and prerogative court, with several other eminent civilians, commonly reside here.

To this college belong 34 proctors, who make themselves parties for their clients, manage their causes, give licences for marriages, &c.

In the common-hall of Doctors-commons are held several courts, under the jurisdiction of the civil law; particularly the high court of admiralty, the court of delegates, the arches court of Canterbury, and the prerogative court of Canterbury, whose terms for sitting are much like those at Westminster, every one of them holding several court-days; most of them fixed and known by preceding holidays, and the rest appointed at the judge's pleasure.

COLLEGE of Physicians, a corporation of physicians in London, whose number, by charter, is not to exceed 50. The chief of them are called fellows; and the next candidates, who fill up the places of fellows as they become vacant by death, or otherwise. Next to these are the honorary fellows; and lastly, the licentiates; that is, such as being found capable, upon examination, are allowed to practise physic.

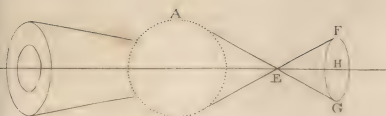
This college has several great privileges granted by charter and acts of parliament. No man can practise physic in, or within seven miles of, London, without licence of the college, under the penalty of *s. l.* Also, persons practising physic in other parts of England are to have letters testimonial from the president and three elects, unless they be graduate physicians of Oxford or Cambridge. Every member of the college is authorized to practise surgery in London or elsewhere; and that they may be able at all times to attend their patients, they are freed from all parish-offices.

The college is governed by a president, four censors, and 12 electors. The censors have, by charter, power

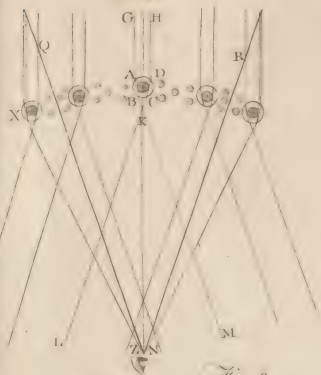
College.

Fig. 1. CORONA or Hale.

N^o 1.



N^o 4.



N^o 2.

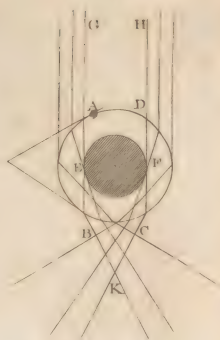
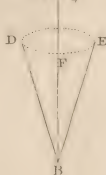
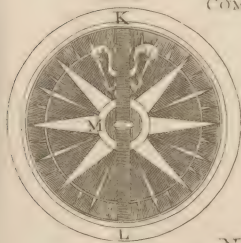


Fig. 2.
CARENING.



Fig. 3.
COMPASS.

N^o 1.



N^o 2.



N^o 3.



Fig. 1.
CYLINDR.



A Bell's Cylinder!

College. power to survey, govern, and arrest all physicians, or others, practising physic in or within seven miles of London; to fine, amerce, and imprison them at discretion; to search apothecaries shops, &c. in and about London; to see if their drugs, &c. be wholesome, and the composition according to the form prescribed by the college in their dispensaries; and to burn, or otherwise destroy, those that are defective or decayed, and not fit for use.

In 1696, 42 members of the college made a subscription, to let on foot a dispensary for the relief of the sick poor, who are advised gratis every day but Sunday, and have medicines sold at the intrinsic value; since this, they have erected two other dispensaries.

Edinburgh COLLEGE of Physicians was erected on the 29th November 1681. The design of this institution was, to prevent the abuses daily committed by foreign and illiterate impostors, quacks, &c. For this reason, his majesty, at the time above-mentioned, granted letters patent to erect into a body corporate and politic, certain physicians in Edinburgh and their successors, by the title of "the President and Royal College of Physicians at Edinburgh," with power to chuse annually a council of seven, one whereof to be president; these are to elect a treasurer, clerk, and other officers; to have a common seal; to sue, and be sued; to make laws for promoting the art of physic, and regulating the practice thereof, within the city of Edinburgh, town of Leith, and districts of the Canon-gate, West-port, Pleasance, and Potter-row; through all which the jurisdiction of the college extends. Throughout this jurisdiction, no person is allowed to practise physic, without a warrant from the college, under the penalty of 5*l*. sterling the first month, to be doubled monthly afterwards while the offence is continued; one half of the money arising from such fines to go to the poor, the other to use of the college. They are also empowered to punish all licentiates in physic within the above-mentioned bounds, for faults committed against the institutions of the college; and to fine them of sums not exceeding 40*s*. On such occasions, however, they must have one of the bailies of the city to sit in judgment along with them, otherwise their sentence will not be valid. They are also empowered to search and inspect all medicines within their jurisdiction, and throw out into the street all such as are bad or unwholesome. That they may the better attend their patients, they are exempted from watching, warding, and serving on juries. They are, however, restrained from erecting schools for teaching the art of physic, or conferring degrees on any person qualified for the office of a physician; but are obliged to license all such as have taken their degrees in any other university, and to admit as honorary members all the professors of physic in the rest of the universities of Scotland. These privileges and immunities are not, however, to interfere with the rights and privileges of the apothecary-surgeons, in their practice of curing wounds, contusions, fractures, and other external operations.

Edinburgh COLLEGE of Surgeons. This is but a very late institution, by which the surgeons of Edinburgh are incorporated into a *Royal College*, and autho-

rised to carry into execution a scheme for making provision for their widows and children, &c.

COLLEGE of Justice, the supreme civil court of Scotland; otherwise called *Court of session*, or, of *council and session*. See LAW, Part III. N^o clvii. 4.

Sion COLLEGE, or the college of the London clergy, was formerly a religious house, next to a hospital; and now it is a composition of both, viz. a college for the clergy of London, who were incorporated in 1631, at the request of Dr White, under the name of the President and Fellows of Sion-college; and an hospital of 10 poor men; the first within the gates of the house, and the latter without.

This college consists of a president, two deans, and four assistants, who are annually chosen from among the rectors and vicars in London, subject to the visitation of the bishop. They have one of the finest libraries in England, built and stocked by Mr Simpson, chiefly for the clergy of the city, without excluding other students on certain terms; they have also a hall with chambers for the students, generally filled with the ministers of the neighbouring parishes.

Gresham-COLLEGE, or *COLLEGE of Philosophy*, a college founded by Sir Thomas Gresham, who built the Royal-exchange; a moiety of the revenue whereof he gave in trust to the mayor and commonalty of London and their successors for ever, and the other moiety to the company of mercers; the first to find four able persons to read in the college, divinity, astronomy, music, and geometry; and the last, three or more able men to read rhetoric, civil-law, and physic; a lecture upon each subject is to be read in turn-time, every day, except Sundays, in Latin, in the forenoon, and the same in English in the afternoon; only the music-lecture is to be read alone in English. The lecturers have each 50*l*. *per annum*, and a lodging in the college.

In this college formerly met the royal society; that noble academy, celebrated throughout the world for their improvements in natural knowledge. See SOCIETY.

COLLEGE of Herald's, commonly called the *Herald's Office*; a corporation founded by charter of king Richard III. who granted them several privileges, as to be free from subsidies, tolls, offices, &c. They had a second charter from king Henry VI.; and a house built near Doctors-commons, by the earl of Derby, in the reign of king Henry VII. was given them by the duke of Norfolk, in the reign of queen Mary, which house is now rebuilt.

This college is subordinate to the earl-marshal of England. They are assistants to him in his court of chivalry, usually held in the common-hall of the college, where they sit in their rich coats of his majesty's arms. See HERALD.

COLLEGIATE, or *COLLEGIAL*, churches are those which have no bishop's fee, yet have the ancient revenue of the bishop, the *canons* and *prebends*. Such are Westminster, Rippon, Windsor, &c. governed by deans and chapters.

Of these collegiate churches there are two kinds; some of royal, and others of ecclesiastical foundation; each of them, in matters of divine service, regulated in the same manner as the cathedrals. There are even

College
|
Collegiate.

Collet
Collier.

even some collegiate churches that have the episcopal rights. Some of these churches were anciently abbeys, which in time were secularized. The church of St Peter's, Westminster, was anciently a cathedral; but the revenues of the monastery being by act of parliament Elizabeth vested in the dean and chapter, it commenced a collegiate church. In several causes the tyling it *cathedral*, instead of *collegiate*, church of Westminster, has occasioned error in the pleadings.

COLLET, among jewelers, denotes the horizontal face or plane at the bottom of brilliants. See BRILLIANT.

COLLET, in glass-making, is that part of glass vessels which sticks to the iron instrument wherewith the metal was taken out of the melting-pot: these are afterwards used for making green glass.

COLLETICS, in pharmacy, denote much the same with AGGLUTINANTS or VULNERARIES.

COLLIER (Jeremy), a learned English nonjuring divine, born in 1650, and educated in Caius college Cambridge. He had first the small rectory of Amp-ton, near St Edmund's Bury in Suffolk; which in six years he resigned, to come to London, in 1685, where he was made lecturer of Gray's-Inn: but the change of government that followed, soon rendered the public exercise of his function impracticable. He was committed to Newgate for writing against the revolution; and again, for carrying on a correspondence which that change of events made treasonable; but was released both times, without trial, by the intervention of friends. It is observable that he carried his scruples so far, as to prefer confinement to the tacit acknowledgment of the jurisdiction of the court by accepting his liberty upon bail. Suitable to these principles, he next acted a very extraordinary part with two other clergymen of his own way of thinking, at the execution of Sir John Friend and Sir William Perkins for the assassination plot; by giving them solemn absolution, and by imposition of hands: absconding for which, he continued under an outlawry to the day of his death in 1726. These proceedings having put a stop to his activity, he employed his retired hours rather more usefully in literary works. In 1698, he attempted to reform our theatrical entertainments, by publishing his *Short view of the immorality and profaneness of the English stage*; which engaged him in a controversy with the wits of the time: but as Mr Collier defended his censures not only with wit, but with learning and reason, it is allowed that the decorum observed, for the most part, by succeeding dramatic writers, has been owing to his animadversions. He next undertook a translation of Moreri's great Historical and Geographical Dictionary; a work of extraordinary labour, and which appeared in 4 vols. folio. After this he published "An Ecclesiastical History of Great Britain, chiefly of England," in 2 vols folio; which is allowed to be written with great judgement, and even with impartiality. He was besides engaged in several controversies, which his conduct and writing gave rise to, not material to mention. In queen Anne's reign, Mr Collier was tempted, by offers of considerable preferment, to a submission; but, as he was a nonjuror upon principle, he could not be brought to listen to any terms.

COLLIER, or COALLIER. See COALLIER.
COLLIERY, COALERY, or COALLIER. See COALERY.

COLLINS (Anthony), a polemical writer, born at Heffen near Hounslow in the county of Middlesex in 1676, was the son of Henry Collins, a gentleman of about L. 1500 a-year. He was first bred at Eaton college, and then went to King's-college Cambridge, where he had for his tutor Mr Francis Hare, afterwards bishop of Chichester. He was afterwards a student of the Temple; but not relishing the law, soon abandoned that study. He was an ingenious man, and author of several curious books. His first remarkable piece was published in 1707, "An Essay concerning the use of reason in propositions, the evidence whereof depends on human testimony." In 1702, he entered into the controversy between Mr Clark and Mr Dodwell, concerning the immortality of the soul. In 1713, he published his discourse on free-thinking; which made a prodigious noise. In 1715, he retired into the county of Essex, and acted as a justice of peace and deputy lieutenant for the same county, as he had done before for that of Middlesex and liberty of Westminster. The same year, he published a "Philosophical Essay concerning human liberty." In 1718, he was chosen treasurer of the county of Essex; and, this office he discharged with great honour. In 1724, he published his "Historical and critical Essay on the 39 articles." Soon after, he published his "Discourse of the grounds and reasons of the Christian religion;" to which is prefixed, "An Apology for free debate and liberty of writing;" which piece was immediately attacked by a great number of writings. In 1726, appeared his "Scheme of literal prophecy considered, in a view of the controversy occasioned by a late book entitled, A discourse of the grounds, &c." In this discourse, he mentions a MS. dissertation of his to shew the Sibylline oracles to be a forgery made in the times of the primitive Christians, who, for that reason, were called *Sibyllists* by the Pagans; but it never appeared in print. His scheme of literal prophecy was replied to by several writers; and particularly by Dr John Rogers in his "Necessity of divine revelation asserted." In answer to which, our author wrote "A letter to the Reverend Dr Rogers, on occasion, &c." His health began to decline some years before his death, and he was very much afflicted with the stone, which at last put an end to his life at his house in Harley Square in 1729. He was interred in Oxford chapel, where a monument was erected to him, with an epitaph in Latin. His curious library was open to all men of letters, to whom he readily communicated all the assistance in his power; he even furnished his antagonists with books to confute himself, and directed them how to give their arguments all the force of which they were capable. He was remarkably averse to all indecency and obscenity of discourse; and was, independent of his scepticism, a sincerely good man.

COLLINS (John), an eminent accountant and mathematician, born in 1624, and bred a bookseller at Oxford. Besides several treatises on practical subjects, he communicated some curious papers to the royal society, of which he was a member, which are to be found

Collier
Collins.

Collins
Collinson.

found in the early numbers of their Philosophical Transactions: and was the chief promoter of many other scientific publications in his time. He died in 1683; and about 25 years after, all his papers coming into the hands of the learned William Jones, Esq; F. R. S. it appeared that Mr Collins held a constant correspondence for many years with all the eminent mathematicians; and that many of the late discoveries in physical knowledge, if not actually made by him, were yet brought forth by his endeavours.

COLLINS (William), an admirable poet, was born at Chichester, about the year 1724. He received his classical education at Winchester; after which he studied at New college, in Oxford, was admitted a commoner of King's college in the same university, and was at length elected a deny of Magdalene college. While at Oxford, he applied himself to the study of poetry, and published his Oriental Eclogues; after which, he came to London. He was naturally possessed of an ear for all the varieties of harmony and modulation; his heart was susceptible of the finest feelings of tenderness and humanity, and was particularly carried away by that high enthusiasm which gives to imagination its strongest colouring; and he was at once capable of soothing the ear with the melody of his numbers, of influencing the passions by the force of the pathos, and of gratifying the fancy by the luxury of description. With these powers, he attempted lyric poetry; and in 1746, published his Odes, descriptive and allegorical: but the fate of this work being not at all answerable to its merit, he burnt the remaining copies in indignation. Being a man of a liberal spirit and a small fortune, his pecuniary resources were unhappily soon exhausted; and his life became a miserable example of necessity, indolence, and dissipation. He projected books which he was well able to execute; and became in idea an historian, a critic, and a dramatic poet; but wanted the means and encouragement to carry these ideas into execution. Day succeeded day, for the support of which he had made no provision; and he was obliged to subsist, either by the repeated contributions of a friend, or the generosity of a casual acquaintance. His spirits became oppressed, and he sunk into a sullen despondence. While in this gloomy state of mind, his uncle colonel Martin died, and left him a considerable fortune. But this came too late for enjoyment; he had been so long harassed by anxiety and distress, that he fell into a nervous disorder, which at length reduced the finest understanding to the most deplorable childishness. In the first stages of this disorder, he endeavoured to relieve himself by travelling, and passed into France; but the growing malady obliged him to return; and having continued, with short intervals, in this pitiable state till the year 1756, he died in the arms of his sister. The ingenious Mr Longhorne has published his poetical works, with memoirs of the author, in one volume duodecimo.

COLLINSON (Peter), fellow of the royal society, descended from an ancient family in the north, was born in 1693: he was bred a quaker, and being, with a brother James, educated to the business of men-mercens, they entered into that trade in partnership. Peter, while a youth, discovered a strong

attachment to natural history; and his diligent curiosity introduced him to an acquaintance with Derham, Woodward, Sir Hans Sloane, and other eminent naturalists. Beside this propensity, his knowledge in the antiquities of his own country was so considerable, that he was a member of the society of antiquarians from its first institution; and was elected a member of the royal society in 1728: he was a most diligent associate in both, furnishing, and procuring, many valuable articles of intelligence, relating to the particular objects of their inquiries, as well at home as abroad. Among his many correspondents was the celebrated Linnæus, with whom, during his residence in England, he contracted an intimate friendship. As his mercantile connections were chiefly in North America, so he interested himself in whatever might promote the advantage of that country. In the year 1730, when a subscription library was negotiating at Philadelphia, Mr Collinson not only made several valuable presents himself, but procured others from his friends: and transmitted over to the directors of this library, among whom was Dr Franklin, the earliest account of every new improvement in agriculture and the arts. He was the first who sent over accounts, in 1745, of the new experiments in electricity, which had been made in Germany, together with a glass tube; which were the first notices Dr Franklin received on a subject he afterward so much excelled in himself. Without any pretensions to what is generally called *learning*, Mr Collinson knew more, both of nature and art, than nine out of ten who pride themselves in the possession of it. He was no less distinguished by his virtues in private life, than by his knowledge; and died of a supression of urine in 1768.

COLLINSONIA, in botany, a genus of the monogynia order belonging to the decandria class of plants. There is but one species, a native of North America, but possessed of no remarkable properties.

COLLIQUAMENTUM, in natural history, an extreme transparent fluid in an egg, observable after two or three days incubation, containing the first rudiments of the chick. It is included in one of its own proper membranes; distinct from the albumen. Harvey calls it the *oculus*.

COLLIQUATION, in chemistry, is applied to animal, vegetable, and mineral substances, tending towards fusion. See FUSION.

COLLIQUATION, in phisic, a term applied to the blood, when it loses its crasis or balsamic texture; and to the solid parts, when they waste away, by means of the animal fluids flowing off through the several glands, and particularly those of the skin, faster than they ought: which occasions fluxes of many kinds, but mostly profuse, greasy, and clammy sweats.

COLLIQUATIVE FEVER, in phisic, a fever attended with a diarrhoea, or with profuse sweats.

COLLISION, the striking of one hard body against another; or the friction or percussion of bodies moving violently with different directions, and dashing against each other.

COLLUSION, in law, a secret understanding between two parties, who plead or proceed fraudulently against each, to the prejudice of a third person.

Collinsonia
Collusion.

Collum

Cologne.

COLLUM, the same with **NECK**.

COLLYRIUM, in pharmacy, a topical remedy for disorder of the eyes; designed to cool and repel hot sharp humours.

They are generally of two kinds; the one liquid, and the other dry. Liquid collyria are composed of ophthalmic powders in waters; as rose-water, plantain-water, or that of fennel, eye-bright, &c. where in tutty, white vitriol, or some other proper powder, is dissolved.

The dry collyrium is troches of rhasis, sugar-candy, tutty prepared, &c. blown into the eye.

COLMAR, a considerable town of France, in Upper Alsace, of which it is the capital. It has great privileges, and the Protestants have liberty of conscience. It is seated near the river Ill, in E. Long. 7. 16. N. Lat. 48. 5.

COLMARS, a town of France in Provence, and the diocese of Sens. It is seated near the Alps, in E. Long. 6. 25. N. Lat. 44. 17.

COLMOGOROD, a town of the empire of Russia, with an archbishop's see, seated in an island formed by the river Divina, in E. Long. 23. 30. N. Lat. 36. 32.

COLNBROOK, a town of Buckinghamshire in England, seated on the river Coln, which separates this county from Middlesex. It is a great thoroughfare on the western road, and has several good inns. W. Long. 0. 19. N. Lat. 51. 30.

COLNE, a town of Lancashire in England, seated on a small hill near the confines of the county. W. Long. 2. 2. N. Lat. 53. 45.

COLOCHINA, an ancient town of the Morea in Turkey in Europe. E. Long. 23. 2. N. Lat. 36. 32.

COLOCYNTHIS, in botany. See **CUCUMIS**.

COLOCZA, a town of Hungary, seated on the Danube, and capital of the county of Bath, with an archbishop's see. It was taken by the Turks in 1686, but afterwards retaken by the Imperialists. E. Long. 19. 42. N. Long. 46. 33.

COLOGNA, a town of Italy in Padua, and in the territory of Venice. E. Long. 11. 43. N. Lat. 45. 39.

COLOGNE (the archbishoprick or diocese of) is one of the states that compose the electoral circle of the Rhine, in Germany. It is bounded on the north by the duchy of Cleves and Gueldres, on the west by that of Juliers, on the south by the archbishoprick of Cleves, and on the east by the duchy of Berg, from which it is almost wholly separated by the Rhine. This country is very fruitful in corn and wine, which the inhabitants dispose of by embarking it on the Rhine, it extending about seventy miles along that river. It is divided into the Higher and Lower Diocese; the Higher Diocese contains that part which lies above Cologne, wherein is Bonne, the capital town of this electorate, and where the elector resides; besides which there are Leichnich, Andernach, Bruyl, Zulich, and Kerpen. The Lower Diocese is on the other side of Cologne, and contains the towns of Zonz, Neufs, Heizarwart, Kempen, Rhyenberg, and Alpen. The city of Cologne and county of Meurs, though within the diocese of Cologne, do not belong to it; for Cologne is a free city, and Meurs belongs to the house of Nassau-Orange; but, by way of re-

compence, the elector has considerable possessions in Westphalia, which they call the *Domain*. It contains the duchy of Westphalia and the county of Reclinchusen. This prelate is one of the electors of the empire, and holds alternately with that of Treves the second or third rank in the electoral college. He is arch-chancellor of the empire in Italy; which dignity was very important when the emperors were masters of Italy, but now it is next to nothing. When the emperors were crowned at Aix la Chapelle, the archbishop of Cologne performed the ceremony, which caused him to pretend to the same right elsewhere; but he was opposed by the archbishop of Mentz. This occasioned an order, that they should each of them have that honour in their own diocese, but if it was done elsewhere, they should perform it alternately. The archbishop of Cologne is elected by the chapter in that city, which is the most illustrious in all Germany. They are all princes or counts, except eight doctors, who have no occasion to prove their nobility.

COLOGNE, an ancient and celebrated town of Germany, in the diocese of that name, with an archbishop's see, and a famous university, seated on the river Rhine, in E. Long. 6. 38. N. Lat. 50. 50. In the times of the Romans, this city was called *Colonia Agrippina*, and *Ubiarum*, because it was built by Agrippina the wife of Claudius I. and mother of Nero; and because the Ubii inhabited this country on the Lower Rhine. In 755, it was an archbishopric, and in 1260 entered into the Hanseatic league. The university was established in 1383 by Pope Urban VI. The city is fortified with strong walls, flanked by 83 large towers, and surrounded with three ditches; but these fortifications being executed after the ancient manner could make but a poor defence at present. It lies in the shape of a half-moon, and is said to have 20 gates, 19 parishes, 37 monasteries, and 365 churches and chapels; but the streets in general are dirty and badly paved, the windows of the houses composed of small bits of round glass, and the inhabitants are but few for so large a place. It is inhabited mostly by Papists; but there are also many Protestants, who repair to the neighbouring town of Mulheim, in the duchy of Berg, for public worship. Its trade, which is considerable, especially in Rhenish wine, is chiefly in the hands of Protestants, and carried on by the Rhine. The ships with which they trade to the Netherlands are of a particular form, and considerable burthen. The clergy here are very numerous, and have large revenues. That of the archbishop is L. 130,000. Baron Pelnitz says, that though Cologne is one of the greatest cities, it is one of the most melancholy in all Europe; there being nothing to be seen but priests, friars and students, many of whom beg alms with a song; and nothing to be heard but the ringing of bells: that there are very few families of quality; that the vulgar are very clownish; and that the noblemen of the chapter stay no longer in town than their duty obliges them. Mr Wright, in his travels, says, that the women go veiled; and that the best gin is that distilled from the juniper berries which grow in this neighbourhood. This city is perhaps the most remarkable of any in the world for the great numbers of precious relics it contains,

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tains, of which the Popish clergy, no doubt, make their advantage. In the church of St Ursula, they pretend to shew her tomb, and the bones of the 11,000 pretended virgin martyrs, though that story is entirely owing to a mistaken inscription. The heads of some of these imaginary martyrs are kept in cases of silver, others are covered with stuffs of gold, and some have caps of cloth of gold and velvet. Brevat says, he saw between 4 and 5000 skulls, decked with garlands, and coronets, ranged on shelves. The canonesse of St Ursula, who must be all countesses, have a handsome income. In their church they pretend to shew three of the thorns of our Saviour's crown, and one of the vessels which contained the water that he converted into wine at the marriage of Cana. In the church of St Gereon are 900 heads of Moorish Cavaliers, said to have been in the army of Constantine before it was converted, and to have been beheaded for refusing to sacrifice to idols. Every one of the heads has a cap of scarlet, adorned with pearls. In the magnificent cathedral of St Peter, the three wife men who came from the east to visit our Saviour, are said to be interred. They lie in a large purple shrine spangled with gold, set upon a pedestal of brais, in the midst of a square mausoleum, faced within and without with marble and jasper. It is opened every morning at nine o'clock, if two of the canons of the cathedral are present, when these kings or wise men are seen lying at full length, with their heads bedecked with a crown of gold garnished with precious stones. Their names, which are *Gasper, Melchior, and Balthasar*, are in purple characters on a little grate, which is adorned with an infinite number of large rich pearls and precious stones, particularly an oriental topaz as big as a pigeon's egg, and valued at above 30,000 crowns. Over against them are six large branches of silver, with wax candles, which burn night and day. The bones of these men, we are told, were brought to Constantinople by Helena mother to Constantine; from thence to Milan by Eustorgius bishop of that see, and afterwards hither by archbishop Rainold. In the Jesuits college are the portraits of the first 13 generals of that order, with Ignatius Loyola at their head; and in the church, which is the finest in Cologne, are many rich statues, with an amazing quantity of fine silver plate; and the utensils for mass are all of gold enriched with precious stones. In the Cordeliers church, is the tomb of the famous Dons Scotus, surnamed *Doflor Subtilis*, with this epitaph, "Scotia me genuit, Anglia me suscepit, Gallia me docuit, Colonia me tenet." Cologne is a free imperial, and as such has a seat and voice at the diets of the empire, and circle of the Lower Rhine. In those of the empire, it has the first place on the Rhenish bench. Towards the defence of the empire, its assessment is 825 florins; and towards the maintenance of the chamber-count, 405 rix-dollars, 72 kruitzers each term. Its militia consists of four companies of foot, who keep guard at the gates. It is governed by its own senate, in respect to civil matters and causes; but the criminal jurisdiction belongs to the elector and his chapter; and so jealous are the inhabitants of him, that they will not permit him to stay in the city above three days at a time, nor to come

into it with a large retinue. For this reason the elector resides commonly at Bonn.

COLOGNE-EARTH, a kind of very light bastard ochre, of a deep brown colour.

COLOMBO, a handsome, pleasant, and strong town of Asia, seated on the eastern side of the island of Ceylon in the East Indies. It was built by the Portuguese in 1638; and in 1658, they were driven from it by the natives, assisted by the Dutch, who are now in possession of it. It is about three quarters of a mile long, and as much in breadth. The natives live in the old town, without the walls of the new: the streets of this last are wide and spacious; and the buildings are in the modern taste, particularly the governor's house which is a handsome structure. E. Long. 80. 25. N. Lat. 7. 0.

COLOMEY, or **COLOMIA**, a town of Poland in Red Russia, seated on the river Pruth, in E. Long. 25. 9. N. Lat. 48. 45.

COLOMNA (Fabio), a very learned botanist, born at Naples about the year 1567. He became skilled in the languages, in music, designing, painting, and the mathematics; and died about the middle of the 17th century. He wrote, 1. *Περὶ βοτανῶν*, seu Plantarum aliquot (ac pilicum) historia. 2. *Minus cognitarum rariorumque stirpium ἱεράσιαι*; itemque de aquatilibus, aliisque nonnullis animalibus, libellus; and other works.

COLON, in anatomy, the first and most considerable of the large intestines. See **ANATOMY**, under n^o 354.

COLON, in grammar, a point, or character formed thus [:], serving to mark a pause, and to divide the members of a period. See **POINTING**; see also **PERIOD**, **COMMA**, and **SEMICOLON**. Grammarians generally assign the use of a colon to be, to mark the middle of a period; or to conclude a sense less perfect than the dot, or period:—but, a sense less perfect than the period, is an expression extremely vague and indeterminate. See **PERIOD**.

Others say, a colon is to be used when the sense is perfect, but the sentence not concluded:—but neither is this over clear and express.

A late author, in an ingenious discourse, *De ratione interpungendi*, marks the office of the colon, and wherein it differs from the semicolon, &c. more precisely. A colon, on his principles, serves to distinguish those conjunct members of a sentence, which are capable of being divided into other members; whereof one, at least, is conjunct. Thus, in the sentence, *As we cannot discern the shadow moving along the dial-plate, so the advances we make in knowledge are only perceived by the distance gone over*; the two members being both simple, are only separated by a comma. In this, *As we perceive the shadow to have moved, but did not perceive it moving; so our advances in understanding, in that they consist of such minute steps, are only perceivable by the distance*;—the sentence being divided into two equal parts, and those conjunct ones, since they include others; we separate the former by a semicolon, and the latter by commas. But in this, *As we perceive the shadow to have moved along the dial, but did not perceive it moving; and it appears the grass has grown, though no body ever saw it grow: so the ad-*

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vances we make in knowledge, as they consist of such minute steps, are only perceivable by the distance—the advancement in knowledge is compared to the motion of a shadow, and the growth of grass; which comparison divides the sentence into two principal parts: but since what is said of the movement of the shadow, and likewise of the growth of grass, contains two simple members, they are to be separated by a femicolon; consequently, a higher pointing is required to separate them from the other part of the sentence, which they are opposed to: and this is a colon. See PUNCTUATION.

COLONEL, in military matters, the commander in chief of a regiment, whether horse, foot, or dragons.

A colonel may lay any officer of his regiment in arrest, but must acquaint the general with it; he is not allowed a guard, only a centry from the quarter-guard.

COLONEL-Lieutenant, he who commands a regiment of guards, whereof the king, prince, or other person of the first eminence, is colonel. These colonel-lieutenants have always a colonel's commission, and are usually general officers.

Lieutenant-COLONEL, the second officer in a regiment, who is at the head of the captains, and commands in the absence of the colonel.

COLONNA, a town of Italy, in the campagna of Rome, 18 miles eastward of that city. E. Long. 15. 15. N. Lat. 42. 0.

COLONNA (Pompey), cardinal archbishop of Montreal in Sicily, and bishop of a very great number of places, made a conspicuous figure in the world. He was equally qualified to wear the cardinal's hat and the helmet, and experienced more than once the reverses of fortune. Julius II. removed him from all his dignities; but Leo I. restored him, created him cardinal, and sent him on several embassies. Clement VII. divested him of the purple, and again restored him to it. It was pretended he was obliged to him for his exaltation to the papal throne. The pope refusing him some request, he reproached him, saying, "That it was by his interest he had arrived at his dignity." The pope replied, "It is true, but let me be pope, and do not endeavour to be so yourself; for by acting as you do, you endeavour to dispossess me of that you have raised me to." He died viceroy of Naples in 1532. He wrote some poems in praise of Isabella Filamarini, in which he protests the chastity of his wishes. He wrote another work, *De laudibus mulierum*.

COLONNADE, in architecture, a peristyle of a circular figure; or a series of columns disposed in a circle, and insulated within side.

A *Polystyle COLONADE*, is that whose numbers of columns is too great to be taken in by the eye at a single view. Such is the colonade of the palace of St Peter's at Rome, consisting of 284 columns of the Doric order, each above four feet and an half diameter, all in Tiburtine marble.

COLONSAY, one of the Hebrides or Western Islands belonging to Scotland. It comprehends that of Oronsay, from which it is only separated in time of flood, and both belong to the same proprietor, viz. Mr McNeil. See ORONSAY.

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COLONUS, an husbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of the year to plough some part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

COLONY, a company of people transplanted into a remote province in order to cultivate and inhabit it.

We may distinguish three kinds of colonies. First, those serving to ease or discharge the inhabitants of a country, where the people are become too numerous, so that they cannot any longer conveniently subsist.

The second are those established by victorious princes and people in the middle of vanquished nations, to keep them in awe and obedience.

The third may be called *colonies of commerce*; because, in effect, it is trade that is the sole occasion and object thereof.

It was by means of the first kind of colonies, that, some ages after the deluge, the east first, and successively all the other parts of the earth, became inhabited: and without mentioning any thing of the Phœnician and Grecian colonies, so famous in ancient history, it is notorious that it was for the establishment of such colonies, that, during the declension of the empire, those torrents of barbarous nations, issuing, for the generality, out of the north, over-run the Gauls, Italy, and the other southern parts of Europe; and, after several bloody battles, divided it with the ancient inhabitants.

For the second kind of colonies, the Romans used them more than any other people; and that to secure the conquests they had made from the west to the east. Every one knows how many cities in Gaul, Germany, Spain, and even England, value themselves on their having been of the number of Roman colonies.

There were two kinds of colonies among the Romans: those sent by the senate; and the military ones, consisting of old soldiers, broken and disabled with the fatigues of war, who were thus provided with lands as the reward of their services. See **BENEFICE**. The colonies sent by the senate were either Roman or Latin, i. e. composed either of Roman citizens or Latins. The colonies of Roman citizens had the right of suffrages; but had no part in the offices or honours of the republic. The inhabitants of Latin colonies, had no right of suffrages without an express permission. According to Ulpian, (*l. 1. D. de Cens.*) there were other colonies, which had little more than the name; only enjoying what they called *jus italicum*, i. e. they were free from the tributes and taxes paid by the provinces. Such were the colonies of Tyre, Berytus, Heliopolis, Palmyra, &c. M. Vailant has filled a volume in folio with medals struck by the several colonies, in honour of the emperors who founded them. The ordinary symbol they engraved on their medals, was either an eagle; as when the veteran legions were distributed in the colonies: or a labourer, holding a plough drawn by a pair of oxen; as when the colony consisted of ordinary inhabitants. On all the medals are seen the names of the decemviri, who held the same rank and had the same authority there as the consuls had at Rome.

Lastly, the *colonies of commerce*, are those established

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blished by the English, French, Spaniards, Portuguese, and other nations within these two last centuries, and which they continue still to establish, in several parts of Asia, Africa, and America; either to keep up a regular commerce with the natives, or to cultivate the ground, by planting sugar-canes, indigo, tobacco, and other commodities. The principal of this kind of colonies, are in the one and the other America, northern and southern; particularly Peru, Mexico, Canada, Virginia, New-England, Carolina, la Louisiana, l'Acadia, Hudson's Bay, the Antilles Islands, Jamaica, Domingo, and the other islands.—In Africa, Madagascar, Cape of Good Hope, Cape Verd, and its islands, and all those vast coasts extended thence as far as to the Red Sea.—Lastly, in Asia, the famous Batavia of the Dutch; Goa, Diu, of the Portuguese; and some other less considerable places of the English, French, and Danes.

The practice of settling commercial colonies in distant countries hath been adopted by the wisest nations of antiquity, who acted systematically upon maxims of sound policy. This appears to have been the case with the ancient Egyptians, the Chinese, the Phenicians, the commercial states of Greece, the Carthaginians, and even the Romans; for though the colonies of the latter were chiefly military, it could easily be shewn that they were likewise made use of for the purposes of trade. The savage nations who ruined the Roman empire, fought nothing but to extirpate or hold in vassalage those whom they overcame; and therefore, whenever princes enlarged their dominions at the expence of their neighbours, they had recourse to strong forts and garrisons to keep the conquered in awe. For this they have been blamed by the famous Machiavel; who labours to shew, that the settling of colonies would have been a cheaper and better method of bridling conquered countries, than building fortresses in them. John de Witt, who was one of the ablest and best statesmen that ever appeared, strongly recommended colonies; as affording a refuge to such as had been unfortunate in trade; as opening a field for such men to exert their abilities, as through want of interest could not raise themselves in their own country; and as a supplement to hospitals and other charitable foundations, which he thought in time might come to be overcharged. Some, however, have ridiculed the supposed advantages of colonies, and asserted that they must always do mischief by depopulating the mother-country. But it must be considered, that such as are inclined to leave their native country to go to a colony, would in all probability do so to go to a foreign nation. Before any colonies were lent from Britain, multitudes left this island and went to the continent, from a variety of causes. In the time of queen Elizabeth, many thousands of Brownists retired to Holland and Zealand; but no sooner did these people hear of the act of religious toleration being passed, than most of them left the dominions of the States, and went to New England.

From this example, and many others which might be adduced, it clearly appears, that colonies, so far from being the means of depopulating a state, are the very reverse, and contribute to the preservation of a

number of subjects that would otherwise be totally lost by their removal into other countries.

It would besides be no very difficult matter to shew from reason alone, that plantations are highly beneficial, as contributing more to the riches and welfare of any country, or at least of any trading country, than fixing settlements in foreign parts; and more especially in such a country as America, where vast regions may be obtained merely by establishing colonies in them. Let us consider what rendered the Portuguese heretofore rich and powerful, and what in some measure keeps them so still; is it not their plantations? If we ask the same question with regard to Spain, we must receive the same answer; and yet there is nothing more certain, than that both these nations are under vast inconveniencies with respect to their plantations: for they draw nothing from them but in fact-faction for commodities and manufactures, and yet the far greatest part, indeed almost all these commodities and manufactures, they purchase themselves from other nations; notwithstanding which prodigious obstacle, it is apparent that their plantations are not only the great and constant, but almost the sole source of their riches. This alone, to a man of sense and reflection, will afford a full conviction of the truth of what has been advanced, as to the benefit of plantations in general.

There is no shorter method with respect to our own in particular, than to consider one that has some staple commodity, which may serve as a model for the rest; and none can answer this purpose better than Virginia, one of the oldest, best cultivated, and most populous of our colonies upon the continent. It is computed that the number of souls indiscriminately may amount in Virginia to about half a million, and of these about 120,000 men, women, and children, may be white, which shews this colony is in itself a thing of prodigious importance. The next thing is to find out what advantages this country derives from such a number of its subjects dwelling there. In the first place it must be observed, that as the value of labour differs in several parts of this kingdom, so the labour of a man in most of the plantations is not only as advantageous to his native country as if he worked at home, but much more so: upon a moderate computation, we may reckon, that such a person contributes to the public stock four times as much. So that we may with reason reckon, that the white people in Virginia, one with another, produce 12l. to this nation; the reason of which will appear, when we consider the nature of their commerce more particularly. But besides this, the negroes are of great advantage to this kingdom, though of infinitely less than the white people would be, if they were employed in the same work; for every one of these poor creatures consumes yearly two hilling-hoes, two weeding-hoes, two grubbing-hoes, besides axes, saws, winbles, nails, and other iron tools and materials. On the whole, there can be no sort of question, because it appears a plain matter of fact, that these people necessarily take off the sum of 150,000l. in the commodities of this country.

This computation must seem prodigious to such as have not applied themselves to calculation; but we must

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must consider, that the people in this colony of Virginia live exactly as we do, or rather more freely, in that generous, open, hospitable, and consequently expensive method that prevailed here in the last age. But as they are supplied both with necessaries and conveniences, with the instruments of labour, as well as the means of luxury, from England, it follows of course, that they must employ an infinite number of hands to provide these. For it is generally known, that these demands must be supplied from those handicrafts and mechanics that have most hands in their service, such as weavers, shoe-makers, hatters, iron-mongers, turners, joiners, taylor, cutlers, smiths, bakers, brewers, rope-makers, hosiery, and indeed all the mechanics in Britain, their manufactures being good merchandize in Virginia. The commodities sent thither, besides linen, silks, India goods, wine, and other foreign manufactures, are cloth, coarse and fine ferges, stuffs, bays, hats, and all sorts of haberdashers ware; hoes, bills, axes, nails, adzes, and other iron ware; cloaths ready made, knives, biscuit, flour, stockings, shoes, caps for servants, &c.

But if they employ these people, they must feed them likewise, and pay them their wages; and not only them, but those who take the pains to go between the planters and these workmen; by which we mean the agents, merchants, or factors, who, tho' fewer in number, yet have their servants and dependents, who, from the nature of their employments, expect to be paid at a better rate. Neither is this all: for when things are made and brought to the factor, they must be put into the hands of a new set of people, who are to be paid for the carriage of them. So that the most common capacity may understand how the labour of every hand in any plantation must be worth four times as much to the community of his mother-country as if he wrought at home; for if he spends so much, and pays for what he has, both of which are undeniable, his labour must produce so much. This shews the benefit of plantations to their mother-country, and how much regard and respect is due from those who manage the affairs of the mother-country, to those who live and labour for her in the plantations. But because it is not impossible we may err a little in the measure of these computations, we shall lay it down as a thing certainly to be depended upon, that every white person in Virginia, one with another, is worth to this nation 101. which will make the value of the whole plantation equal to an annuity of 1,200,000l. to Great Britain.

In order to shew how this sum, or at least the greatest part of it, is received, we must consider that the trade of Virginia, as well as that of Maryland, consists almost entirely of tobacco: for though the country would produce several excellent commodities fit for trade, yet the planters are so wholly bent on planting tobacco, that they seem to have laid aside all thoughts of other improvements. This trade is brought to such perfection, that the Virginia tobacco, especially the sweet-scented, which grows on York river, is reckoned the best in the world, and what is generally vended in Britain for the home-consumption: the other sorts, called Oronoco, and that of Maryland, are hotter in the mouth; but they turn to as good account,

being in demand in Holland, Denmark, Sweden, and Germany: it is therefore from this commodity that we are to look for the best part of that vast sum which we have mentioned.

In time of peace, there is very little less than 100,000 hogheads of tobacco exported every year from this colony; that between three and four hundred ships are employed in this trade, and upwards of 4000 seamen. If we take things upon this foot, then the 100,000 hogheads of tobacco will produce about the sum at which we have fixed the produce of this colony to the nation: but it may be said, that if we take tobacco for the commodities and manufactures that we send to Virginia, it differs very widely from an annuity, and that, instead of receiving 1,200,000l. from the persons inhabiting this plantation, we return them the most valuable things we have, for 60,000,000 pounds of tobacco, which in itself is no necessary of life, and which we might very well do without. But, to solve this difficulty, let us consider that tobacco was in use amongst us long before it was cultivated, or at least brought to perfection, as appears by king James I. writing a book against it; what we used came hither from Brazil, or from the Spanish plantations, and was actually sold here from four to 17s. a pound. In case the consumption of tobacco had become equal to what it is now, and we had been furnished with it by foreigners, it would have carried off all our commodities and manufactures into the bargain; but suppose it had fallen to 5s. a pound only, this alone would have cost us seven millions either in goods or in money. At 5s. a pound indeed, tobacco could not have grown into general use, but into frequent and common use it would have grown; and therefore it must have cost us a great deal; whence it may be justly inferred, that our home consumption is a saving of as much as the value amounts to. Besides this, we export annually 40,000 hogheads, which produces us generally 300,000 pounds, the net annual income of one commodity brought over from one of our colonies.

All the other colonies, settlements, and establishments, which we have in different parts of the world, contribute in like manner, but in different proportions, to take off the commodities and manufactures, to employ the people, to increase the shipping, and to extend the trade of this nation; and with this singular and valuable advantage, that so long as we behave towards them with the duty and tenderness of a parent, it is simply impossible that this trade should fail us, or that we should lose any part of our plantation commerce. We have already shown, how the commodities we have from thence, become, when wrought, to all intents and purposes, our own manufactures; so that the people in the colonies, and their slaves, where they have slaves, undergo all the drudgery and labour, while we subsist our own people by the manufacture of their commodities, and draw from thence annually immense profits, in which the people of the plantations have no share whatsoever. Such are the prerogatives of a mother-country, and such and so great the benefits she reaps by being so!

After having thus examined into the reason of the thing, let us next ask, *What was the condition of this country before we had any plantations?* The answer drawn

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drawn from history and observation must be to this effect : At the time queen Elizabeth entered upon the government, the customs produced 36,000 l. a-year ; at the restoration, they were lett to farm for 400,000 l. and produced considerably above double that sum before the revolution. The people of London, before we had any plantations, and but very little trade, were computed at about 100,000 : at the death of queen Elizabeth, they were increased to 150,000 ; and are now about six times that number. In those days we had not only our naval stores, but our ships, from our neighbours. Germany furnished us with all things made of metal, even to nails : wine, paper, linen, and a thousand other things, came from France. Portugal furnished us with furs ; all the produce of America was poured upon us from Spain ; and the Venetians and Genoese retailed to us the commodities of the East Indies at their own price. In short, the legal interest of money was 12 per cent. and the common price of our land 10 or 12 years purchase. We may add, that our manufactures were few, and those but indifferent ; the number of English merchants very small ; and our shipping much inferior to what now belong to the northern colonies. These are plain and certain facts. But, as soon as we began to extend our trade, and to make settlements abroad, the face of our affairs changed : the inhabitants of the metropolis were doubled by the end of the last period, and are again doubled before the end of this ; our shipping increased in a still greater proportion ; we coined, within 20 years after that queen's death, about five millions at the Tower ; in 20 years after that, seven ; and in the next 20 years, eight ; which are indubitable proofs that we had gained a prodigious balance of trade in our favour.

The next point to be considered is, *What our condition has been since ?* And with respect to this it may be boldly affirmed, that it has altered for the better, almost to a degree beyond credibility or computation. Our manufactures are prodigiously increased, chiefly by the demand for them in the plantations, where they at least take off one half, and furnish us with many valuable commodities for exportation. Instead of taking the quantities we were wont to do of goods from other nations, we actually export those very goods, and sometimes to the very same nations. Sugar, rum, and tobacco, are the sources of private wealth and public revenue, which would have been to many drains that would have beggared us, had they not been raised in our plantations. It is no longer in the power of the Russians to make us pay what they please for flax and hemp. The Swedes cannot compel us to pay their own price, and that too in ready money, for pitch and tar ; nor would it be in their power to distress us, should they attempt it, by raising the price of copper and iron. Logwood is sunk 75 per cent. ; indigo, and other dyeing materials, are in our power, and at moderate prices. In short, the advantages are infinite that redound to us from our American empire ; where we have at least a million of British subjects, and between 1500 and 2000 sail of ships constantly employed.

Such have been the fruits, such is the condition, of our plantations ; — or rather, such, till of late,

was their condition. The sad reverse that has taken place is well known to all our readers. For us to depict it, would be a task equally superfluous and painful. And as to what may be the issue of the unhappy contest, or what consequences may finally ensue ; these can only be the subject of our anxiety, of our hopes or fears : for clouds and darkness as yet rest upon the prospect.

The history of the British colonies, however, shows, that when colonists become numerous and opulent, it is very difficult to retain them in proper subjection to the parent state. It becomes then a question not very easily answered, how far they are entitled to the rights they had as inhabitants of the mother-country, or how far they are bound by its laws ? On this subject Mr Blackstone hath the following observations.

“ Plantations, or colonies in distant countries, are either such where the lands are claimed by right of occupancy only, by finding them desert and uncultivated, and peopling them from the mother-country ; or where, when already cultivated, they have either been gained by conquest, or ceded to us by treaties. And both these rights are founded upon the law of nature, or at least on that of nations. But there is a difference between these two species of colonies with respect to the laws by which they are bound. For it hath been held, that if an uninhabited country be discovered and planted by English subjects, all the English laws then in being, which are the birthrights of every subject, are immediately there in force. But this must be understood with many and very great restrictions. Such colonists carry with them only so much of the English law as is applicable to their own situation, and the condition of an infant colony ; such, for instance, as the general rules of inheritance, and of protection from personal injuries. The artificial refinements and distinctions incident to the property of a great and commercial people, the laws of policy and revenue (such especially as are enforced by penalties) the mode of maintenance for the established clergy, the jurisdiction of spiritual courts, and a multitude of other provisions, are neither necessary nor convenient for them, and therefore are not in force. What shall be admitted, and what rejected, at what times, and under what restrictions, must, in cases of dispute, be decided in the first instance by their own provincial judicature, subject to the revision and controul of the king in council ; the whole of their constitution being also liable to be new-modelled and reformed by the general superintending power of the legislature in the mother-country. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change those laws ; but, till he does actually change them, the ancient laws of the country remain, unless such as are against the law of God, as in an infidel country. Our American plantations are principally of this latter sort, being obtained in the last century, either by right of conquest and driving out the natives (with what natural justice I shall not at present inquire), or by treaties. And therefore, the common law of England, as such, has no allowance or authority there ; they being no part of the mother country, but distinct (though dependent) dominions. They are subject, however, to the controul of the parliament ;

Colony. parliament; though, (like Ireland, Mann, and the rest,) not bound by any acts of parliament, unless particularly named."

Colophony.

With respect to their interior polity, our colonies are properly of three sorts. 1. Provincial establishments, the constitutions of which depend on the respective commissions issued by the crown to the governors, and the instructions which usually accompany those commissions; under the authority of which, provincial assemblies are constituted, with the power of making local ordinances not repugnant to the laws of Britain. 2. Proprietary governments, granted out by the crown to individuals, in the nature of feudalitary principalities, with all the inferior regalities, and subordinate powers of legislation which formerly belonged to the owners of counties palatine: yet still, with these express conditions, that the ends for which the grant was made be substantially pursued, and that nothing be attempted which may derogate from the sovereignty of the mother-country. 3. Charter governments, in the nature of civil corporations; with the power of making bye-laws for their own interior regulation, not contrary to the laws of Britain; and with such rights and authorities as are specially given them in their several charters of incorporation. The form of government, in most of them, is borrowed from that of England. They have a governor named by the king (or, in some proprietary colonies, by the proprietor), who is representative or deputy. They have courts of justice of their own, from whose decisions an appeal lies to the king in council here in England. Their general assemblies, which are their house of commons, together with their council of state, being their upper house, with the concurrence of the king, or his representative the governor, make laws suited to their own emergencies. But it is particularly declared, by stat. 7 and 8 W. III. c. 22. that all laws, bye-laws, usages and customs, which shall be in practice in any of the plantations, repugnant to any law made or to be made in this kingdom relative to the said plantations shall be utterly void, and of none effect. And, because several of the colonies had claimed the sole and exclusive right of imposing taxes upon themselves, the statute 6 Geo. III. c. 12. expressly declares, that all his Majesty's colonies in America, have been, are, and of right ought to be, subordinate to and dependent upon the imperial crown and parliament of Great Britain; who have full power and authority to make laws and statutes of sufficient validity to bind the colonies and people of America, subjects to the crown of Great Britain in all cases whatsoever. And the attempting to enforce this by other acts of Parliament, penalties, and at last by military power, gave rise, as is well known, to the present revolt of our colonies.

COLOPHONY, in pharmacy, black resin, or turpentine, boiled in water, and afterwards dried; or, which is still better, the caput mortuum remaining after the distillation of the etherial oil, being further urged by a more intense and long continued fire.—It receives its name of *colophonia*, from Colophon, a city of Ionia; because the best was formerly brought from thence. Two sorts are mentioned in ancient writings; the one dry, the other in a liquid form. The latter

seems to have been liquid pitch, which is the crude resin of the pine brought from Colophon; the other was called *resina fricta*, and consisted only of the former deprived of its humid parts.

COLOQUINTIDA, in botany. See CUCUMIS.

COLORATURA, in music, denotes all manner of variations, trillos, diminutions, &c. serving to make a song agreeable.

COLORNO, a town of Italy, in the Parmazan, near the river Po, 8 miles from Parma. The duke of Parma has a pleasure-house here, one of the most delightful seats in all Italy, and the gardens are very fine. E. Long. 9. 15. N. Lat. 44. 54.

COLOSSUS, a statue of enormous or gigantic size. The most eminent of this kind was the *Colossus* of Rhodes; a statue of Apollo, so high, that ships passed with full sails betwixt its legs. It was the workmanship of Chares, a disciple of Lysippus; who spent 12 years in making it: it was at length overthrown by an earthquake, after having stood 1360 years. Its height was sixscore and six feet: there were few people could fathom its thumb, &c. Some critics observe, that the *Colossus* of Rhodes gave its own name to the people among whom it stood; and that many, at least among the ancient poets, call the Rhodians, *Colossians*; hence they advance an opinion, that the Colossians in scripture, to whom St Paul directs his epistle, are, in reality, the inhabitants of Rhodes. Of this sentiment are Suidas, Calepine, Munster, &c. When the Saracens became possessed of the island, the statue was found prostrate on the ground: they sold it to a Jew, who loaded 900 camels with the brass.

The basis that supported it was a triangular figure, its extremities were sustained with 60 pillars of marble. There was a winding-stair-case to go up to the top of it; from whence one might discover Syria, and the ships that went into Egypt, in a great looking-glass, that was hung about the neck of the statue. Among the antiquities of Rome, there are seven famous *Colossuses*: two of Jupiter, as many of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOSTRUM, the first milk of any animal after bringing forth young, called *breastmilk*. It is remarkable that this milk is generally cathartic, and purges the meconium; thus serving both as an aliment and medicine.

An emulsion prepared with turpentine dissolved with the yolk of an egg, is sometimes called by this name.

COLOSWAR, a large and celebrated town of Transylvania, where the senates have their meetings. It is seated on the river Samos in E. Long. 22. 45. N. Lat. 46. 53.

COLOUR, in physics, a property inherent in light, by which, according to the various sizes of its parts, or from some other cause, it excites different vibrations in the optic nerve; which propagated to the sensorium, affect the mind with different sensations. See CHROMATICS and OPTICS.

COLOUR, in painting, is applied both to the drugs, and to the tints produced by those drugs variously mixed and applied.

The principal colours used by painters are red and white lead, or ceruus; yellow and red ochres; several kinds

Coloquin-
tida
Colour.

Colour.

kinds of earth, umbre, orpiment, lamp-black, burnt ivory, black lead, cinnabar or vermilion, gamboge, lacca, blue and green ashes, verdigraese, bistre, bice, smalt, carmine, ultramarine: each of which, with their uses, &c. are to be found under their proper articles.

Of these colours some are used tempered with gum-water; some ground with oil; others only in freisco; and others for miniature.

Painters reduce all the colours they use under these two classes, of dark and light colours: dark colours are black, and all others that are obscure and earthy, as umbre, bistre, &c.

Under light colours are comprehended white, and all that approach nearest to it.

Painters also distinguish colours into simple and mineral.

Under simple colours they rank all those which are extracted from vegetables, and which will not bear the fire; as the yellow made of saffron, French berries, lacca, and other tinctures extracted from flowers, used by limners, illuminers, &c.

The mineral colours are those which being drawn from metals, &c. are able to bear the fire, and therefore used by enamellers. Changeable and permanent colours is another division, which, by some, is made of colours.

Changeable colours are such as depend on the situation of the objects with respect to the eye, as that of a pigeon's neck, taffeties, &c. the first however being attentively viewed by the microscope, each fibre of the feathers appears composed of several little squares, alternately red and green, so that they are fixed colours.

Water COLOURS, are such as are used in painting with gum-water, or size, without being mixed with oil.

Incapacity of distinguishing COLOURS. Of this extraordinary defect in vision, we have the following instances in the philosophical Transactions for 1777. One of the persons lived at Maryport in Cumberland. The account was communicated by Mr Huddart to Dr Priestley, and is as follows. "His name was Harris, by trade a shoe-maker. I had often heard from others, that he could discern the form and magnitude of all objects very distinctly, but could not distinguish colours. This report having excited my curiosity, I conversed with him frequently on the subject. The account he gave was this: That he had reason to believe other persons saw something in objects which he could not see; that their language seemed to mark qualities with precision and confidence, which he could only guess at with hesitation, and frequently with error. His first suspicion of this arose when he was about four years old. Having by accident found in the street a child's stocking, he carried it to a neighbouring house to inquire for the owner: he observed the people called it a *red* stocking, though he did not understand why they gave it that denomination, as he himself thought it completely described by being called a *stocking*. This circumstance, however, remained in his memory, and, together with subsequent observations, led him to the knowledge of his defect.

"He also observed, that when young, other chil-

dren could discern cherries on a tree, by some pretended difference of colour, though he could only distinguish them from the leaves by the difference of their size and shape. He observed also, that by means of this difference of colour they could see the cherries at a greater distance than he could, though he could see other objects at as great a distance as they, that is, where the sight was not assisted by the colour. Large objects he could see as well as other persons; and even the smaller ones if they were not enveloped in other things, as in the case of cherries among the leaves.

"I believe he could never do more than guess the name of any colour; yet he could distinguish white from black, or black from any light or bright colour. Dove or straw colour he called *white*, and different colours he frequently called by the same name, yet he could discern a difference between them when placed together. In general, colours of an equal degree of brightness, however they might otherwise differ, he confounded together. Yet a striped ribbon he could distinguish from a plain one; but he could not tell what the colours were with any tolerable exactness. Dark colours, in general, he often mistook for black; but never imagined white to be a dark colour, nor dark to be a white colour.

"He was an intelligent man, and very desirous of understanding the nature of light and colours; for which end he had attended a course of lectures in natural philosophy.

"He had two brothers in the same circumstances as to sight; and two other brothers and sisters, who, as well as their parents, had nothing of this defect.

"One of the first mentioned brothers, who is now living, I met with at Dublin, and wished to try his capacity to distinguish the colours in a prism; but not having one by me, I asked him, whether he had ever seen a rain-bow? he replied, He had often, and could distinguish the different colours; meaning only, that it was composed of different colours, for he could not tell what they were.

"I then procured, and shewed him a piece of ribbon: he immediately, and without any difficulty, pronounced it a striped, and not a plain, ribbon. He then attempted to name the different stripes: the several stripes of white he uniformly and without hesitation called white: the four black stripes he was deceived in; for three of them he thought brown, though they were exactly of the same shade with the other, which he properly called black. He spoke, however, with diffidence, as to all those stripes; and it must be owned, that the black was not very distinct: the light green he called yellow; but he was not very positive: he said, "I think this is what you call yellow." The middle stripe, which had a slight tinge of red, he called a sort of blue. But he was most of all deceived by the orange colour; of this he spoke very confidently, saying, "this is the colour of grass; this is green." I also shewed him a great variety of ribbons, the colour of which he sometimes named rightly, and sometimes as differently as possible from the true colours.

"I asked him, whether he imagined it possible for all the various colours he saw to be mere difference of

Colour.

Colour. light and shade; and that all colours could be composed of these two mixtures only? With some hesitation he replied, No, he did imagine there was some other difference.

"It is proper to add, that the experiment of the striped ribbon was made in the day-time, and in a good light."

COLOURS for staining different kinds of Stones. See CHEMISTRY, n^o 197.

COLOUR, in dyeing. See DYEING.

COLOUR of *Plants*, is an attribute found to be very variable. Different colours are observed, not only in different individuals of the same species, but likewise in different parts of the same individual. Thus, marvel of Peru, and sweet-William, have frequently petals of different colours on the same plant. Three or four different colours are frequently found upon the same leaf or flower; as on the leaves of the amaranthus, tricolor, and the flowers of the tulip, auricula, three-coloured violet, and others. To produce the most beautiful and striking variety of colours in such flowers, is the principal delight and business of the florist.

The primitive colours, and their intermediate shades or gradations enumerated by botanists, are as follow.

Water-colour, *hyalinus*.

WHITE.

Lead-colour, *cinerescens*.

BLACK, *niger*.

Brown, *fuscus*.

Pitch-black, *ater*.

YELLOW, *luteus*.

Straw-colour, *flavus*.

Flame-colour, *fulvus*.

Iron-colour, *gilvus*.

RED.

Flesh-colour, *incarnatus*.

Scarlet, *coccineus*.

PURPLE.

Violet-colour, *cœruleo-purpureus*.

BLUE, *cœruleus*.

GREEN.

These colours seem to be appropriated to particular parts of the plant. Thus, white is most common in roots, sweet berries, and the petals of spring flowers. Water-colour, in the filaments and styles. Black, in the roots and seeds; rarely in the seed-vessel, and scarce ever to be found in the petals. Yellow is frequent in the antheræ or tops of the stamina; as likewise in the petals of autumnal flowers, and the compound ligulated flowers of Linnæus. Red is common in the petals of summer flowers, and in the acid fruits. Blue and violet-colour, in the petals. Green, in the leaves and calix, but rarely in the petals. In the interchanging of colours, which in plants is found to depend upon differences in heat, climate, soil and culture, a sort of elective attraction is observed to take place. Thus, red is more easily changed into white and blue; blue into white and yellow; yellow into white; and white into purple. A red colour is often changed into a white, in the flowers of heath, mother of thyme, betony, pink, viscous campion, *cucubalus*, trefoil, orchis, fox-glove, thistle, cudweed, saw-wort,

rose, poppy, fumitory, and geranium. Red passes into blue in pimpernel. Blue is changed into white in bell-flower, greek-valerian, bindweed, columbine, violet, vetch, milk-wort, goat's rue, viper's bugloss, comfrey, borragé, hyssop, dragon's-head, scabious, blue-bottle, and fuccory. Blue is changed into yellow in crocus. Yellow passes easily into white in melilot, agrimony, mullein, tulip, *biataria*, or moth-mullein, and corn marigold. White is changed into purple in wood-forrel, thorn-apple, pease, and daisy.

Although plants are sometimes observed to change their colour upon being moistened with coloured juices, yet that quality in vegetables seems not so much owing to the nature of their nourishment, as to the action of the internal and external air, heat, light, and the primitive organisation of the parts. In support of this opinion, we may observe with Dr Grew, that there is a far less variety in the colours of roots than of the other parts of the plant, the pulp, within the skin, being usually white, sometimes yellow, rarely red. That this effect is produced by their small intercourse with the external air appears from this circumstance, that the upper parts of roots, when they happen to stand naked above the ground, are often dyed with several colours: thus the tops of forrel roots turn red; those of turnips, mullein, and radishes, purple; and many others green: whilst those parts of the same roots which lie more under ground are commonly white. The green colour is so proper to leaves, that many, as those of sage, the young sprouts of St John's wort, and others which are reddish when in the bud, acquire a perfect green upon being fully expanded. In like manner, the leaves of the sea-side grape, *polygonum*, which when young are entirely red, become, as they advance in growth, perfectly green, except the middle and transverse ribs, which retain their former colour.

As flowers gradually open and are exposed to the air, they throw off their old colour, and acquire a new one. In fact, no flower has its proper colour till it is fully expanded. Thus the purple stock-julyflowers are white, or pale in the bud. In like manner bachelor's buttons, blue-bottle, poppy, red daisies, and many other flowers, though of divers colours when blown, are all white in the bud. Nay, many flowers change their colours thrice successively; thus, the very young buds of lady's looking-glass, bugloss, and the like, are all white; the larger buds purple, or murrey; and the open flowers blue.

With respect to the colours of the juices of plants, we may observe, that most resinous gums are tinged; some, however, are limpid; that which drops from the domestic pine is clear as rock-water. The milk of some plants is pale, as in birdock; of others white, as in dandelion, euphorbium, and scorzonera; and of others yellow, as in lovage, and greatercelandine. Most mucilages have little colour, taste or smell. Of all the colours above enumerated, green is the most common to plants, black the most rare.

Colour being a quality in plants so apt to change, ought never to be employed in distinguishing their species. These ought to be characterised from circumstances not liable to alteration by culture or other accidents. The same inconstancy of colour observed

Colour.

Colour.

in the flowers, is likewise to be found in the other parts of plants. Berries frequently change from green to red, and from red to white. Even in ripe fruits, the colour, whether white, red, or blue, is apt to vary; particularly in apple, pear, plum, and cherry trees. Seeds are more constant in point of colour than the vessel which contains them. In the feeds, however, of the poppy, oats, pea, bean, and kidney-bean, variations are frequently observed. The root too, although not remarkably subject to change, is found to vary in some species of carrot and radish. Leaves frequently become spotted, as in a species of orchis, hawk-weed, ranunculus, knot-grass, and lettuce; but seldom relinquish their green colour altogether. Those of some species of amaranthus, or flower-gentle, are beautifully coloured. The spots that appear on the surface of the leaves are of different colours, liable to vary, and not seldom disappear altogether. The leaves of officinal lung-wort, and some species of fowbread, sorrel, trefail, and ranunculus, are covered with white spots. Those of dog's-tooth violet, with purple and white. Those of several species of ranunculus, and orchis, and a kind of knot-grass called by Tournefort *pescaria ferrugine quinum referens*, with black and purple. Those of amaranthus, tricolor, with green, red and yellow. Those of ranunculus acris, and a species of bog-bean, with red or purple. The under surface of the leaves of some species of pimpernel and the sea-plantain is marked with a number of dots or points; a white line runs through the leaves of Indian reed, black-berried heath, and a species of canary grass; and the margin or brim of the leaf, in some species of box, honey-suckle, ground-ivy, and the ever-green oak, is of a silver-white colour. The whole plant is often found to assume a colour that is unnatural or foreign to it. The varieties in some species of eryngo, mugwort, orrach, amaranthus, purslane, and lettuce, furnish examples.

Such being the inconstancy of colour in all the parts of the plant, specific names derived from that quality are, very properly, by Linnaeus, deemed erroneous; whether they respect the colour of the flower, fruit, seeds, root, leaves, or express in general the beauty or deformity of the entire plant, with a particular view to that circumstance. Of this impropriety committed by former botanists, Linnaeus himself is not always guiltless. Thus the two species of *sarracena*, or the side-saddle flower, are distinguished by the colour of their petals into the yellow and purple *sarracena*; although the shape and figure of the leaves afforded much more constant as well as striking characters. The fame may be said of his *lupinus albus*, and *luteus*; *reseda alba*, *glauca*, and *lutea*; *angelica atro-purpurea*; *dictamnus albus*; *laminum album*; *selago coccinea*; *sida alba*; *passiflora rubra*, *lutea*, *incarnata*, and *cœrulea*; and of many others, in which the specific name is derived from a character or quality that is so liable to vary in the same species.

We shall conclude this article with observing, that of all sensible qualities, colour is the least useful in indicating the virtues and powers of vegetables. The following general positions on this subject are laid down by Linnaeus, and seem sufficiently confirmed by ex-

periment. A yellow colour generally indicates a bitter taste; as in gentian, aloë, calandine, turmeric, and other yellow flowers. Red indicates an acid or four taste; as in cranberries, barberries, currants, rasp-berries, mulberries, cherries; the fruit of the rose, sea-buckthorn, and service-tree. Herbs that turn red towards autumn, have likewise a four taste; as sorrel, wood-sorrel, and bloody-dock. Green indicates a crude alkaline taste, as in leaves and unripe fruits. A pale colour denotes an insipid taste, as in endive, asparagus, and lettuce. White promises a sweet, luscious taste; as in white currants, and plums, sweet apples, &c. Lastly, black indicates a harsh, nauseous, disagreeable taste; as in the berries of deadly night-shade, myrtle-leaved fumach, herb-christopher and others; many of which are not only unpleasant to the taste, but pernicious, and deadly in their effects.

To be ascertained of the acid or alkaline property of any plant, express some of the juice, and rub it upon a piece of blue paper; which, if the plant in question is of an acid nature, will turn red; if of an alkaline, green. For the methods of extracting colours from the different parts of plants, see the article *COLOUR-Making*.

COLOUR of the Human Species, Difference of. Few questions in philosophy have engaged the attention of naturalists more than the diversities among the human species, among which that of colour is the most remarkable. The great differences in this respect have given occasion to several authors to assert, that the whole human race have not sprung from one original; but that as many different species of men were at first created, as there are now different colours to be found among them. Under the article *AMERICA*, n° 42—53, we have shewn that all the arguments which can be brought for specific differences among mankind, whether drawn from a difference of colour, stature, or disposition, must necessarily be inconclusive. It remains, however, a matter of no small difficulty to account for the remarkable variations of colour that are to be found among different nations. On this subject Dr Hunter hath published a thesis, in which he considers the matter more accurately than hath commonly been done, and determines absolutely against any specific difference among mankind. He introduces his subject by observing, that when the question has been agitated, whether all the human race constitute only one species or not, much confusion has arisen from the sense in which the term *species* has been adopted. He therefore thinks it necessary to set out with a definition of the term. He includes under the same species all those animals which produce issue capable of propagating others resembling the original stock from whence they sprung. This definition he illustrates by having recourse to the human species as an example. And in this sense of the term he concludes, that all of them are to be considered as belonging to the same species. And as, in the case of plants, one species comprehends several varieties depending upon climate, soil, culture, and similar accidents; so he considers the diversities of the human race to be merely varieties of the same species, produced by natural causes. Of the different colours observable among mankind, he gives the following view:

Colour.

Colour.

- BLACK.** Africans under the line.
Inhabitants of New Guinea.
Inhabitants of New Holland.
- SWARTHY.** The Moors in the northern parts of Africa.
The Hottentots in the southern parts of it.
- COPPER-COLOURED.** The East Indians.
- RED-COLOURED.** The Americans.
- BROWN-COLOURED.** Tartars.
Persians.
Arabs.
Africans on the coast of the Mediterranean.
Chinese.
- BROWNISH.** The inhabitants of the southern parts of Europe; as
Sicilians,
Abyssinians,
Spaniards,
Turks, and likewise the Samoiedes and Laplanders.
- WHITE.** Most of the European nations; as
Swedes,
Danes,
English,
Germans,
Poles, &c.
Kubardinski,
Georgians,
Inhabitants of the islands in the Pacific Ocean.

In attempting to investigate the causes of these differences, our author observes, that there can be no dispute of the seat of colour being placed in the skin; that it is not even extended over the whole of this, but confined to that part named the cuticle, consisting of the epidermis and reticulum; and that it chiefly occupies the latter of these. The cuticle is much thicker and harder in black people than in white ones; the reticulum in the latter being a thin mucus, in the former a thick membrane. He concludes that this seat of colour in whites is transparent, and either totally deprived of vessels, or only furnished with very few; as the yellow colour appearing in jaundice vanishes on the cause of the disease being removed; which is not the case with stains in the cuticle from gunpowder, or similar causes. He next points out three causes destroying the pellucidity of the cuticle, giving it a brown colour, and rendering it thicker. These are, accretions of air, nastiness, and the heat of the sun. The influence of each of these he proves by many examples; and from these he is inclined to consider the last as by much the most powerful. If, however, it be admitted that these causes have this effect, he thinks that all the diversity of colour which is to be observed among mankind, may be thus accounted for. He remarks, that all the inhabitants of the torrid zone incline more or less to a black colour. When we observe the differences which occur amongst them, we must at the same time remember, that a black colour is not referred to heat alone, but to the other causes also: and when we attend to the diversity of

Colour.

temperature that occurs even in the torrid zone, the existence of a white nation there would by no means destroy the argument. He is farther of opinion, that the existence of a brown colour, and of considerable varieties from white, in the northern and coldest parts of Europe, may very easily be explained. This he accounts for from the manner of life of the inhabitants, by which they are either exposed to the inclemency of the air, or to constant nastiness from smoky houses.

Having thus attempted to account, from natural causes, for the varieties which occur among mankind with respect to colour, our author observes, that, to all this reasoning, an objection will naturally be made, from considering that infants bring these marks into the world along with them, before they can be exposed to any such causes. Dr Hunter imagines, however, that this may readily be explained upon the supposition that many peculiarities acquired by parents are transmitted to their posterity; and of this, he thinks, no one can entertain the least doubt who attends to hereditary diseases. Thus, gout, scrophula, mania, and many other affections, although at first induced by particular accidents, will continue to affect families for many generations. In the same manner, a parent exposed to causes destroying the natural whiteness of his complexion, will beget swarthy children; and the same causes continuing to operate upon the son, the blackness will be increased. Thus all the different shades may have been at first induced, and afterwards continued.

COLOUR, in heraldry. The colours generally used in heraldry are red, blue, black, green and purple, which the heralds call gules, azure, sable, vert or sinople, and purpure; tenné or tawny, and sanguine, are not so common: as to yellow and white, called *or*, and *argent*, they are metals, not colours.

The metals and colours are sometimes expressed in blazon by the names of precious stones, and sometimes by those of planets or stars. See **BLAZONING**.

Oenomaus is said to have first invented the distinction of colours, to distinguish the gundillæ of combatants of the Circensian games; the green for those who represented the earth, and blue for those who represented the sea.

COLOURS, in the military art, include the banners, flags, ensigns, &c. of all kinds, borne in the army or fleet. See **FLAG**, and **STANDARD**.

COLOURS, in the Latin and Greek churches, are used to distinguish several mysteries and feasts, celebrated therein.

Five colours only are regularly admitted into the Latin church; these are white, green, red, violet, and black: the white is for the mysteries of our Saviour, the feasts of the virgin, those of the angels, saints, and confessors; the red is for the mysteries and solemnities of the holy sacrament, the feasts of the apostles and martyrs; the green for the time between pentecost and advent, and from epiphany to septuagesima; the violet in advent and Christmas, in vigils, rogations, &c. and in votive masses in time of war; lastly, the black is for the dead, and the ceremonies thereto belonging.

In the Greek church, the use of colours is almost abolished, as well as among us; red was, in the Greek church,

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church, the colour for Christmas, and the dead, as black among us.

To COLOUR *strangers goods*, is when a freeman allows a foreigner to enter goods at the custom-house in his name.

COLOUR-Making, the art of preparing the different kinds of colours used in painting.

This art properly belongs to chemistry; and is one of the most curious, though least understood, parts of it. The principles on which colour-making depends are entirely different from those on which the theory of other parts of chemistry is founded; and the practical part being in the hands of those who find it their interest to conceal their methods as much as possible, it thence happens; that there is not only no distinct theory of this art, but scarce a single good receipt for making any one colour hath ever appeared.

Division of colours into opaque and transparent.

The first general division of colours is into opaque and transparent. By the first are meant such colours as, when laid over paper, wood, &c. cover them fully so as to efface any other painting or stain that might have been there before; the others are of such a nature as to leave the ground on which they are laid, visible through them. Of the first kind are white-lead, red-lead, vermilion, &c. of the latter kind are the colours used for illuminating maps, &c.

Oil and water colours.

Another division is into oil-colours, and water-colours; by which is meant such as are appropriated to painting in oil, and in water. Most of those which are proper for painting in water, are also proper for being used in oil. There is, however, this remarkable difference betwixt colours when mixed with water and with oil, that such as are quite opaque in water, will become perfectly transparent in oil. Thus, blue verditer, though exceedingly opaque in water, if ground with oil, seems totally to dissolve, and will become very transparent. The same thing happens to such colours as have for their basis the calx of tin, alabaster, or calcareous earth. The most perfectly opaque colours in oil are such as have lead, mercury, or iron, for their basis: to the latter, however, Prussian blue is an exception; for though the basis of that colour is iron, it proves quite transparent when ground with oil. In water-colours, those prepared from metals, Prussian blue alone excepted, are always opaque; from vegetables or animals, transparent. Coals, however, whether vegetable or animal, are opaque both in water and oil.

Simple and compound tints.

Colours again may be considered as either simple or compound. The simple ones are such as require nothing to be superadded to them, in order to make a full strong colour, without regarding whether they are formed of many or few ingredients; and in this view, white-lead, red-lead, vermilion, calces of iron, &c. are simple colours. The compound ones are formed by the union of two or more colouring substances; as blue and yellow united together to form a green, red and yellow to form an orange, a white earth or calx with the red colour of cochineal or brazil, to form a lake, &c. and thus, carmine, lake, rose-pink, Dutch-pink, English-pink, &c. are compound colours.

True and false colours.

The last and most important division of colours is into true and false. By the former are meant those which retain their colour under every possible variety

of circumstances, without fading in the least: the others are such as do not; but either lose their colour altogether, or change to some other. What is chiefly apt to affect colours, is their being exposed to the sun in summer, and to the cold air in winter; but to this there is one exception, *viz.* white-lead, which, when ground with oil, retains its whiteness if exposed to the weather, but degenerates into a brownish or yellowish colour if close kept. In water this substance is very apt to lose its colour, whether exposed to the air or not. The great desideratum in colour-making is to produce the first kind of colours, *viz.* such as will not fade by exposure to the weather; and indeed it is to be regretted, that the most beautiful are in general the least permanent. It may, for the most part, however, be expected, that the more simple any colour is, the less liable will it be to change upon exposure to the air.

The great difficulty of knowing *a priori* whether a colour will fade or not, is owing to our ignorance concerning the nature of colouring substances. With all our disadvantages, however, we may observe, that whatever change of colour is produced in any substance by exposure to the sun and air, that colour to which it changes will bid fair for being permanent; and therefore ought to be employed where it can be done.

Of these changes, the instances are but very rare. One is in the purple of the ancients, which assumed its colour by exposure to the sun, and consequently was exceedingly permanent. Another is in the solution of silver, which, being mixed with chalk, the precipitate turns to purplish black where it is exposed to the sun. A third is in solutions of indigo by alkaline substances, which constantly appear green till exposed to the air by spreading them very thin, upon which they become almost instantaneously blue, and continue so ever after. Sometimes, though still more rarely, a very remarkable change of colour happens, upon mixing two vegetable juices together. Almost the only instance of this we have on the authority of Mr George Forster, who informs us that the inhabitants of Otaheite dye their cloth of a crimson-colour, by mixing together the yellow juice of a small species of fig, with the greenish juice of a kind of fern. But the most remarkable alterations of colour are effected by different metallic and saline solutions mixed with certain animal or vegetable substances; and with these the colour-maker will be principally conversant.

It is a common observation in chemistry, that acids mixed with blue vegetable juices turn them red, and alkalis, green. It is equally certain, though not so generally known, that acids of all kinds generally tend to heighten red colours, so as to make them approach to the scarlet or true crimson; and alkalis to darken, or make them approach to blue or purple. Mixed with yellow colours, acids also universally tend to brighten the yellow; and alkalis to turn it to an orange, and make it become more dull. But though this is very generally the case, we are not to expect that all acids are equally powerful in this respect. The nitrous acid is found to heighten the most of any, and the marine acid the least of the mineral ones. The vegetable, as might be expected, are less powerful than the mineral acids. Thus, if with a tincture of

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5
Instances of colours produced by exposure to the sun and air.

6
By the mixture of two vegetable juices.

7
Effects of acids and alkalis on colour.

cochineal.

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cochineal, either in water or spirit of wine, is mixed the pure nitrous acid, it will change the colour to an exceeding high orange or flame-colour, which it will impart to cloth. If the vitriolic acid is used, a full scarlet, inclining to crimson rather than orange, is produced. With marine acid a true crimson-colour, bordering on purple, is the consequence. Alkalies, both fixed and volatile, change the colour to a purple, which is brighter with the volatile than the fixed alkalies.

8

Permanency of colours, by what determined.

Here it is obvious, that whatever colours are produced by the mixtures of different substances together, the permanency of these colours can only be in proportion to the ability of such mixtures to resist the weather. Thus, suppose a full scarlet or orange colour is produced by means of spirit of nitre, it is plain that, was such a colour exposed to the air, it could remain no longer than the spirit of nitre which produced it remained. In proportion, therefore, as the spirit of nitre was exhaled into the air, or otherwise destroyed, it behaved the colour to fade, and at last to be totally destroyed; and thus, in proportion to the destructibility of the substances by which colours are produced, will be the disposition of such colours to fade, or the contrary. In this respect alkalies are much more destructible than acids, and consequently less proper for the preparation of colours. With regard to acids, the nitrous seems most destructible, the vitriolic less so, and the marine the least of all. From the extreme fixity of the phosphoric acid and sedative salt, perhaps they might be of service in preserving colours.

As all colours, whether derived from the animal or vegetable kingdom, must be extracted either by pure water or some other liquid menstruum, they cannot be used for the purposes of painting till the colouring substance is united with some earthy or solid matter, capable of giving it a *body*, as the workmen call it; and according to the nature of this substance, the colour will be transparent or otherwise. This basis ought to be of the most fixed and durable nature; unalterable by the weather, by acids, or by alkalies. It ought also to be of a pure white colour, and easily reducible into an impalpable powder. For this reason all earthy substances should be avoided as being acted upon by acids; and therefore, if any of these were added to heighten the colour, they would not fail to be destroyed, and their effect totally lost. Precipitates of lead, bismuth, &c. though exceedingly fine and white, ought also to be avoided, as being apt to turn black by exposure. The only substance to be chosen in preference to all others, is calx of tin, prepared either by fire or the nitrous acid. This is so exceedingly refractory as not only to be unalterable by alkalies, acids, or the sun and weather, but even by the focus of a very large burning mirror. It is besides white as snow, and capable of being reduced to an extreme degree of fineness, inasmuch that it is made use of for polishing metalline speculums. For these reasons it is the most proper basis for all fine colours. For coarse ones, the white precipitate of lead, mentioned under the article CHEMISTRY, n° 152, will answer very well. It hath a very strong body, i. e. is very opaque, and will cover well; may be easily ground fine, and is much less apt to turn black than

white-lead; it is besides very cheap, and may be prepared at the small expence of 3 d. per pound.

If what we have just now observed is attended to, the general method of extracting colours from any vegetable or animal substance, and fixing them on a proper basis, must be very easily understood. For this purpose, a quantity of calx of tin is to be procured in proportion to the quantity of colour desired. This must be well rubbed in a glass mortar, with a little of the substance designed for brightening the colour, as alum, cream of tartar, spirit of nitre, &c. after which it must be dried, and left for some time, that the union between the two substances may be as perfect as possible. If the colour is to be a very fine one, suppose from cochineal, the colouring matter must be extracted with spirit of wine without heat. When the spirit is sufficiently impregnated, it is to be poured by little and little upon the calx, rubbing it constantly, in order to distribute the colour equally through all parts of the calx. The spirit soon evaporates, and leaves the calx coloured with the cochineal. More of the tincture is then to be poured on, rubbing the mixture constantly as before; and thus, with proper management, may very beautiful colours, not inferior to the best carmine, be prepared at a moderate expence. If, instead of cochineal, we substitute brazil-wood, turmeric, logwood, &c. different kinds of red, yellow, and purple, will be produced. For the coarser colours, aqueous decoctions are to be used in a similar manner; only as these are much longer of evaporating than the spirit of wine, very little must be poured on at a time, and the colours ought to be made in large quantity, on account of the tediousness of the process.

Hitherto we have considered only the effects of the pure and simple salts, viz. acids and alkalies, on different colours; but by combining the acids with alkalies, earths, or metals, these effects may be varied almost *in infinitum*; neither is there any rule yet laid down by which we can judge *a priori* of the changes of colour that will happen on the admixture of this or that particular salt with any colouring substance. In general, the perfect neutrals act weakly; the imperfect ones, especially those formed from metals, much more powerfully. Alum and sal ammoniac considerably heighten the colour of cochineal, brazil, turmeric, fustic, madder, logwood, &c. The same thing is done, though in a less degree, by common salt, Glauber's salt, salt-petre, and many other neutrals. Solutions of iron in all the acids strike a black with every one of the above mentioned substances; and likewise with sumach, galls, and other astringents. Solutions of lead, or saccharum saturni, universally debase red colours to a dull purple. Solution of copper changes the purple colour of logwood to a pretty good blue; and, in general, solutions of this metal are friendly to blue colours. The effects of solutions of gold, silver, and mercury, are not so well known; they seem to produce dark colours of no great beauty. The most powerful solution, however, with regard to a great number of colours, is that of tin, made in aqua regia. Hence we may see the fallacy of Mr Delaval's hypothesis concerning colours*, that the least refrangible ones are produced

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General method of preparing colours.

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Calx of tin, the most proper basis for fine colours.

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Effects of different kinds of salts.

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Solution of tin the most powerful.
* See Chymistry, n° 8.

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making.

by the most dense metals : for tin, which hath the least density of any metal, hath yet, in a state of solution, the most extraordinary effects upon the least refrangible colours as well as those that are most so. The colour of cochineal is changed by it into the most beautiful scarlet; a similar change is made upon the colouring matter of gum-lac. Brazil-wood is made to yield a fine purplish crimson; logwood, a beautiful dark purple; turmeric, fustic, weld, and all yellow-colouring woods and flowers, are made to communicate colours far more beautiful than can be got from them by any other method. The blue colour of the flowers of violets, eye-bright, iris, &c. are heightened so as to equal, if not excel, the blue produced by a solution of copper in volatile alkali. In short, this solution seems to be of much more extensive use in colour-making, when properly applied, than any thing hitherto thought of. It is not, however, universally serviceable. The colour of madder it totally destroys, and likewise that of safflower, changing them both to a dull orange. It likewise spoils the colour of archil; and what is very remarkable, the fine red colour of tincture of roses made with oil of vitriol, is by solution of tin changed to a dirty green.

The most important consideration in colour-making is to make choice of such materials as produce the most durable colours; and if these can be procured, an ordinary colour from them is to be preferred to a bright one from those which fade sooner. In what the difference consists between the colours that fade, and those which do not, is not known with any degree of certainty. From some appearances it would seem that those substances which are most remarkable for keeping their colour, contain a viscous, glutinous matter so combined with a refinous one as to be soluble both in water and spirit of wine. The most durable red colour is prepared from gum-lac. This is very strongly refinous, though at the same time so far glutinous, that the colouring-matter can be extracted from it by water. Next to gum-lac, are madder roots and cochineal. The madder is an exceedingly penetrating substance, inasmuch, that when given to animals along with their food, it tinges their bones of a deep red colour. Its colouring-matter is soluble both in water and spirit of wine. Along with the pure red, however, there is in madder a kind of viscous, asstringent substance, of a dark brown colour, which seems to give the durability to the whole. The colouring-matter of cochineal, though soluble both in water and spirit of wine, is v. y. tenacious and mucilaginous, in which it bears some resemblance to the *purpura* of the ancients, which kept its colour exceedingly well. Where the colours are fugitive, the tinging substance seems to be too refinous, or too mucilaginous. Thus the colours of brazil, turmeric, &c. are very refinous, especially the latter; inasmuch that the colouring-matter of turmeric can scarcely be extracted by water. Both these are perishable, though beautiful colours; and much more are the red, purple and blue flowers, commonly to be met with. These seem to be entirely mucilaginous without the least quantity of refinous matter. The yellow flowers are different, and in general keep their colour pretty well. Whether it would be possible, by adding occa-

sionally a proper quantity of gum or resin, to make the fugitive colours more durable, hath not yet been tried, but seems to have some probability. What tends a little to confirm this, is a process given by Mr. Hellot for imparting durability to the colour of brazil. It consists only in letting decoctions of the wood stand for some time in wooden casks till they grow stale and rropy. Pieces of woollen cloth now dyed in the liquor acquired a colour so durable, that they were not in the least altered by exposure to the air during four months in the winter season. Whether this change in the durability of the colour was effected by the ropiness following the fermentation, or by some other cause, or whether the experiment can be at all depended upon, must be referred to future observation.

Having thus collected all that can as yet be depended upon for establishing a general theory of colour-making, we shall now proceed to give an account of the different pigments generally to be met with in the colour-shops.

1. *Black*. These are lamp-black, ivory-black, blue-black, and Indian-ink. The first is the finest of what are called the foot-blacks, and is more used than any other. Its preparation is described in the Swedish Transactions for the year 1754, as a process dependent on the making of common resin: the impure refinous juice collected from incisions made in pine and fir trees, is boiled down with a little water, and strained whilst hot through a bag: the dregs and pieces of bark left in the strainer are burnt in a low oven, from which the smoke is conveyed through a long passage into a square chamber, having an opening on the top on which is a large sack made of thin woollen stuff: the foot, or lamp-black, concretes partly in the chamber, from whence it is swept out once in two or three days, and partly in the sack, which is now and then gently struck upon, both for shaking down the foot, and for clearing the interstices betwixt the threads, so as to procure a sufficient draught of air through it. In this manner lamp-black is prepared at the turpentine houses in England, from the dregs and refuse of the refinous matters which are there manufactured.

On this subject, Dr Lewis hath some curious observations. "The foot, (says he,) arising in common chimneys, from the more oily or refinous woods, as the fir and pine, is observed to contain more dissoluble matter than that from the other woods: and this dissoluble matter appears, in the former, to be more of an oily or refinous nature than in the latter; spirit of wine extracting it most powerfully from the one, and water from the other. The oiliness and solubility of the foot seeming, therefore, to depend on those of the subject it is made from, it has been thought that lamp-black must possess these qualities in a greater degree than any kind of common foot. Nevertheless, on examining several parcels of lamp-black, procured from different shops, I could not find that it gave any tincture at all, either to spirit or to water.

"Suspecting some mistake or sophistication, or that the lamp-black had been burnt or charred, as it is to fit it for some particular uses, I prepared myself some foot from linseed oil, by hanging a large copper pan over

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Mr Hellot's
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over the flame of a lamp to receive its smoke. In this manner the more curious artists prepare lamp-black for the nicer purposes; and from this collection of it from the flame of a lamp, the pigment probably received its name. The foot so prepared gave no tincture either to water or to spirits, any more than the common lamp-black of the shops. I tried different kinds of oily and resinous bodies with the same event; even the soots obtained from fish-oils and tallow did not appear to differ from those of the vegetable-oils and resins. They were all of a finer colour than the lamp-black commonly sold.

"Some foot was collected in like manner from fir and other woods, by burning small pieces of them slowly under a copper-pan. All the soots were of a deeper black colour than those obtained from the same kinds of woods in a common chimney, and very little, if at all, inferior to those of the oils: they gave only a just discernible tincture to water and spirit, while the soots of the chimney imparted a strong deep one to both. The foot of mineral bitumens, in this close way of burning, appears to be of the same qualities with those of woods, oils, and resins: in some parts of Germany, great quantities of good lamp-black are prepared from a kind of pit-coal.

"It appears, therefore, that the differences of soots do not depend altogether on the qualities of the subjects, but in a great measure on the manner in which the subject is burnt, or the foot caught. The soots produced in common chimneys, from different kinds of wood, resinous and not resinous, dry and green, do not differ near so much from one another, as those which are produced from one kind of wood in a common chimney, and in the confined way of burning above-mentioned."

19
Ivory-
black.

Ivory-black is prepared from ivory or bones burnt in a close vessel. This, when finely ground, forms a more beautiful and deeper colour than lamp-black; but in the common methods of manufacturing, it is so much adulterated with charcoal-dust, and so grossly levigated, as to be unfit for use. An opaque deep black for water-colours, is made by grinding ivory-black with gum-water, or with the liquor which settles from the whites of eggs after they have been suffered to stand a little. Some use gum-water and the whites of eggs together, and report, that a small addition of the latter makes the mixture flow more freely from the pencil, and improves its glossiness. It may be observed, however, that though ivory-black makes the deepest colour in water as well as in oil-painting, yet it is not on this account always to be preferred to other black pigments. A deep jet-black colour is seldom wanted in painting; and in the lighter shades, whether obtained by diluting the black with white bodies, or by applying it thin on a white ground, the particular beauty of the ivory-black is in a great measure lost.

20
Blue-black.

Blue-black is said to be prepared from the burnt stalks and tendrils of the vine. These, however, the colour-makers seldom give themselves the trouble of procuring, but substitute in its place a mixture of ivory-black and the common blue used for cloaths.

21
Indian-ink.

Indian-ink is an excellent black for water-colours. It hath been discovered by Dr Lewis to consist of a

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mixture of lamp-black and common ghee. Ivory-black, or charcoal, he found to answer equally well, provided they were levigated to a sufficient degree of fineness, which indeed requires no small trouble.

22

White
colours.

2. *White.* The white colours commonly to be met with are, white-flake, white-lead, calcined hartshorn, pearl-white, Spanish-white, egg-shell white, and magistery of bismuth. The flake-white and white-lead are properly the same. The preparation of the former is kept a secret; the method of preparing the latter is described under CHEMISTRY, n° 281. These are the only whites that can be used in oil, all the rest being transparent unless they are laid on with water. Calcined hartshorn is the most useful of the earthy whites, as being the least alkaline. Spanish-white is only finely prepared chalk. Pearl-white is made from oyster-shells; and egg-shell white from the shells of eggs. All these, by their attraction for acids, must necessarily destroy such colours as have any acid or metallic salt in their composition. The magistery of bismuth is apt to turn black, as are also flake-white and white-lead, when used in water. The white precipitate of lead recommended under CHEMISTRY, n° 152, is greatly superior as a water-colour to all these; being perfectly free of any alkaline quality, and not at all apt to lose its own colour, or to injure that of other substances.

23

Red co-
lours.

3. *Red.* The red colours used in painting are of two sorts; viz. those which incline to the purple, and such as are of a full scarlet and tend rather to the orange. The first are carmine, lake, rose-pink, red-ochre, and Venetian-red. The second are vermilion, red-lead, scarlet-ochre, common Indian-red, Spanish-brown, and terra di Sienna, burnt.

We have already laid down some general rules for the preparation of carmine and lake. Particular receipts have been delivered with the greatest confidence for making these fine colours; but all of them must necessarily prove ineffectual, because an earthy basis is recommended for striking the colour upon: from the principles of chemistry, however, we are certain, that if aqua fortis, or solution of tin, is made use of for brightening a colour made with any earthy basis, it must infallibly be destroyed by that basis, by reason of its alkaline quality. Carmine is the brightest and most beautiful red colour known at present; the best comes from France. Lake differs from it in being capable of mixture with oil, which carmine is not, unless with great difficulty. The former is also much more inclined to purple than carmine. This last quality, however, is reckoned a defect; and accordingly, the more that lake approaches to the scarlet or true crimson, the more it is valued. On dropping solution of tin into an aqueous tincture of brazil-wood, a beautiful precipitate falls, of a purplish crimson colour. This may be very well substituted in place of the dearer lakes, on many occasions.

Rose-pink is a very beautiful colour, inclining more to the purple than scarlet. It seems to be made of chalk coloured with a decoction of brazil-wood, heightened by an alkaline salt; for which reason it is exceedingly perishable, and but little esteemed. The colour might be made much more durable as well as better, by employing for a basis the white precipitate of lead above-mentioned,

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mentioned, and brightening it with solution of tin. Red-ochre and Venetian-red differ in nothing from the colcothar of vitriol well calcined. The calces of iron may be made to appear either purplish, or inclining to the scarlet, according to the manner in which the calcination is performed. If the matter is perfectly deprived of its phlogiston, and subjected to an intense fire, it always turns out red; but the mixture of a small quantity of inflammable matter gives it a purplish cast. Hence various paints are kept in the shops under different names, which yet differ from each other only in the slight circumstance above-mentioned: and such are the scarlet-ochre, Spanish-brown, and terra di Sienna burnt. It is remarkable, that the calces of iron never show their colour till they become cold. Colcothar of vitriol, while hot, always appears of a very dark, dusky purple.

Of the preparation of vermilion and red-lead, an account is given under the article CHEMISTRY, n° 402, 474. These are very durable colours; the first is the best red used in oil-painting, but does not answer well in water: the other is rather an orange; and, like other preparations of lead, is in some cases apt to turn black.

4. *Orange.* The only true orange-colored paints are red-orminet and orange-lake. The first is a sublimate formed of arsenic and sulphur; the other may be prepared from turmeric infused in spirit of wine, having its colour struck upon calx of tin, and brightened by a solution of that metal. All the shades of orange, however, may be extemporaneously prepared by mixing red and yellow colours together in due proportions.

5. *Yellow.* The yellow paints most commonly in use are, king's-yellow, Naples-yellow, Dutch-pink, English-pink, masticot, common orpiment, yellow-ochre, terra di Sienna unburnt, and Turbith-mineral.

King's-yellow is evidently an arsenical preparation. Its colour is exceedingly beautiful, but apt to fade; on which account, and its great price, it is seldom used.

Naples-yellow was for a long time thought to be a preparation of arsenic, but is now discovered to have lead for its basis*. It is therefore apt to turn black and lose its colour, which makes it the less valuable. It is nevertheless used in preference to king's-yellow, on account of its inferiority in price. This colour is particularly liable to be spoiled by iron when moist, and therefore should never be touched by that metal unless previously ground in oil.

Dutch-pink is said to be prepared by striking the colour of yellow berries upon finely levigated chalk. But of this there is great reason to doubt: the basis of Dutch-pink seems much more hard and gritty than chalk, and its colour more durable than those struck upon that earth usually are. Very good yellows may be prepared with the white precipitate of lead formerly mentioned, by using either yellow berries, masticot, or any other substance capable of yielding that colour. English-pink is paler than the Dutch, and keeps its colour greatly worse.

Masticot is prepared by calcining white-lead till it assumes a yellowish colour. It is not apt to change, but the colour is so dull that it is seldom used either in oil or water.

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Common orpiment is a pretty bright greenish-yellow, prepared by subliming arsenic with sulphur. Its nauseous smell, which is greatly increased by grinding in oil, makes it very disagreeable; nor does it keep its colour for any length of time. That kind of orpiment least inclined to green is to be preferred for the purposes of painting.

Yellow-ochre and terra di Sienna, are ferruginous earths, capable of becoming red by calcination. Green vitriol precipitated by lime may be advantageously substituted to either of them. See CHEMISTRY, n° 148.

Turbith-mineral is but little used in painting, though its fine yellow colour seems greatly to recommend it. This preparation is also in all probability very durable; and should seem therefore worthy of a preference either to king's, or Naples, yellow. The method of preparing it is described under CHEMISTRY, n° 154.

Gamboge is a paint that can only be used in water, and is the most common yellow made use of for colouring maps, &c. but for this it is not very proper, being neither quite transparent, nor very durable.

6. *Green.* The only simple green colour that hath a tolerable degree of brightness is verdigraese, or preparations of it. This, however, though a very beautiful colour, is far from being durable. It is improved in colour, though not in durability, by dissolution and crystallization in distilled vinegar; in which state it is called *distilled verdigraese*. A more durable water-colour is made by dissolving the verdigraese in cream of tartar, or rather the pure tartarous acid; but in oil this is found to be equally fugitive with the verdigraese itself. For an account of these preparations, see CHEMISTRY, n° 298.

Compound greens are either made of Prussian, or some other blue, mixed with yellow; but in whatever way these colours can be compounded, the beauty of the green produced is greatly inferior to distilled, or even common, verdigraese. The tartarous solution of verdigraese, mixed with a little gamboge, is the best transparent green water-colour we have had an opportunity of trying; and a mixture of Prussian-blue and turbith-mineral is probably the best opaque one.

Sap-green is a simple colour, but exceedingly inferior to distilled verdigraese, or even to the tartarous solution of verdigraese with gamboge. It is prepared from the juice of unripe buckthorn-berries evaporated to the consistence of a gum. Its green-colour is greatly inclined to yellow. A kind of compound green has been sometimes used, called *Prussian-green*, which consists only of Prussian-blue and yellow-ochre. It has no beauty, nor is it durable. It is prepared as Prussian-blue, only not pouring on any spirit of salt to dissolve the ochreous sediment which falls at the same time.

Another green sometimes used is called *terra verte*. This is a native earth, probably impregnated with copper. It is of a bluish green colour, much of that taint called *sea-green*. It is gritty, and therefore must be well levigated before it is used. Its colour is durable, but not very bright.

7. *Blue.* The blue colours are ultramarine, Prussian-blue, verditer, smalt, bice, and indigo. Of these the ultramarine is the finest, but its great price hinders its being much used. It is a preparation from

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Green colours.

27
Blue colours.

12 I

lapis

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lapis lazuli; is an exceeding bright colour, and never fades with whatever substance it is mixed. It is now, however, in a great measure superseded by Prussian-blue, to the disadvantage of painting in general; as Prussian-blue, though very beautiful, is far from being durable. For an account of its preparation see the article ULTRAMARINE.

The process for making Prussian-blue is described, and its nature fully considered, under CHEMISTRY, n° 287: so that it is sufficient here to observe, that Prussian-blue is to be accounted of the best quality when it is deep, bright, and not inclined to purple. It ought to be tried by mixture with white-lead, as the brightness of the colour will appear much more when diluted than when concentrated in the lumps of the blue itself.

Blue verditer is an exceeding bright blue colour, inclining to green. The method of preparing it is kept a secret *. It is durable in water, but dissolves in oil, and has then all the inconveniences of verdigrise above-mentioned.

Smalt is glass-coloured with zaffre, a preparation from cobalt †. It is commonly so grossly powdered that it cannot be used in painting, and its texture is so hard that it cannot easily be levigated. Its colour is exceedingly bright and durable; so that when finely levigated it is used instead of ultramarine. The most proper materials for levigating this substance seem to be the plates of M. Reamur's porcelain recommended by Dr Lewis. See CHEMISTRY, n° 92, 97. For the preparation and qualities of bice, see the articles LAPIS ARMENUS and BICE.

Indigo is but little used in painting either in oil or water, on account of the dulness of the colour. It requires no other preparation than being washed over. Its goodness is known by the darkness and brightness of the colour. See INDIGO.

8. *Purple*. The only simple colour of this kind used at present is colcothar of vitriol. A beautiful purple lake may be prepared from logwood by means of solution of tin; but this method of preparing colours is very little known as yet.

9. *Brown*. The brown colours are, bistre, brown ochre, Cologne-earth, umbre, and brown pink. Under the article BISTRE is given a process for making that colour, by infusing foot in water, pouring off the tincture, and then evaporating it to an extract; but Dr Lewis is of opinion, with Mr Landois in the French *Encyclopédie*, that the foot is either boiled in water, or ground with a little liquid of some kind into a smooth paste: it is then diluted with more water, and after standing for about half an hour till the grosser substance of the foot has settled, the liquor is poured off into another vessel, and set by for two or three days that the finer parts may fall to the bottom, and this fine matter is the bistre. This is a very useful colour in water, being exceedingly fine, durable, and not apt to spoil any other colours with which it is mixed. The brown pink is said to consist of chalk tinged with the colouring matter of fustic, heightened by fixed alkaline salts. It is therefore very perishable, and is seldom used. The other browns are a kind of ochreous earths; for a description of which see their proper articles.

Having now considered most of the colouring substances usually to be met with in the shops, we shall next take notice of some attempts that have been made to produce all the different colours from vegetables, after the manner of lakes; which, though the methods hitherto tried have for the most part failed of success, may perhaps some time or other be found applicable to valuable purposes.

From infusions of alstringent vegetables mixed with green vitriol, is produced a deep black liquor of very extensive use in dyeing *. The substances which produce the deepest blacks are galls and logwood. When a decoction or infusion of the galls is dropped into a solution of the vitriol largely diluted with water, the first drops produce bluish or purplish red clouds, which soon mingling with the liquor, turn it uniformly of their own colour. It seems to be on the quality of the water that this difference in the colour depends. With distilled water, or the common spring-waters, the mixture is always blue. If we previously dissolve in the water the most minute quantity of any alkaline salt, too small to be discovered by any of the common means by which waters are usually tried, or if the water is in the least putrid, the colour of the mixture proves purple or reddish. Rain-water caught as it falls from the clouds in an open field in clean glass-vessels, gives a blue; but such as is collected from the tops of the houses, grows purple with the mixture of vitriol and galls: from whence it may be presumed, that this last has contracted a putrid tendency, or received an alkaline impregnation, though so slight as not to be sensible on other ways of trial.

Both the purple and blue liquors, on adding more of the alstringent infusion, deepen to a black, more or less intense according to the nature of dilution: if the mixture proves of a deep opaque blackness, it again becomes bluish or purplish when further diluted. If suffered to stand in this diluted state for two or three days, the colouring matter settles to the bottom in form of a fine black mud, which by slightly shaking the vessel, is diffused again through the liquor, and tinges it of its former colour. When the mixture is of a full blackness, this separation does not happen, or in a far less degree; for though a part of the black matter precipitates in standing, yet so much remains dissolved, that the liquor continues black. This suspension of the colouring substance, in the black liquid, may be attributed in part to the gummy matter of the alstringent infusion increasing the consistence of the watery fluid; for the separation is retarded in the diluted mixture, by a small addition of gum Arabic. If the mixture either in its black or diluted state is poured into a filter, the liquor passes through coloured; only a part of the black matter remaining on the filter. The filtered liquor on standing for some time becomes turbid and full of fine black flakes: being freed from these by a second filtration, it again puts on the same appearance; and this repeatedly, till all the colouring parts are separated, and the liquor has become colourless.

Dr Lewis, from whose Philosophical Commerce of Arts this account is taken, further informs us, that this colouring matter, when separated from the liquor and dried, appeared of a deep black, which did not seem

Colour-
making.

31

Attempts to
make lakes
of all col-
ours.

32

Black from
alstringents.

* See Dye-
ing.

* See Che-
mistry,
n° 201.

† See Zaffre
and Smalt.

28
Purple co-
lours.

29
Brown co-
lours.

30
Dr Lewis's
opinion concerning
bistre.

Colour-making.

to have suffered any change from the air by exposure for upwards of four months. Made red-hot, it glowed and burnt, but did not flame, and became a rusty brown powder, which was readily attracted by a magnetic bar; though in its black state the magnet had no action upon it. The vitriolic acid, diluted with water and digested on the black powder, dissolved greatest part of it, leaving only a very small quantity of whitish matter. Solution of pure fixed alkaline salt dissolved very little of it: the liquor received a reddish brown colour, and the powder became blackish brown. This residuum was attracted by the magnet after being red-hot, though not before: the alkaline tincture, passed through a filter, and mixed with a solution of green vitriol, struck a deep brownish black colour, nearly the same with that which results from mixing with the vitriolic solution, an alkaline tincture of galls.

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Black from a combination of other colours.

It hath also been attempted to produce black from a combination of other colours; as green may be produced from a mixture of blue and yellow. Mr le Blon, in his *Harmony of Colours*, gives a method of forming black, by mixing together the three colours called primitive, viz. blue, red, and yellow; and Mr Castet, in his *Optique des Couleurs*, published in 1740, says that this compound black has an advantage, in painting, above the simple ones, of answering better for the darkening of other colours. Thus, if blue, by the addition of black, is to be darkened into the colour called *blue-black*, the simple blacks, according to him, if used in sufficient quantity to produce the requisite deepness, conceal the blue, while the compound blacks leave it distinguishable. Le Blon does not mention the proportions of the three colours necessary for producing black. Castet directs 15 parts of blue; five of red, and three of yellow; but takes notice, that these proportions are rather speculatively than practically just, and that the eye only can be the true judge; our colours being all very imperfect, and our pigments or other bodies of one denomination of colour being very unequal in their degree of intensity. He observes, that the pigments should all be of the deepest and darkest kind; and that, instead of taking one pigment for each colour, it is better to take as many as can be got; for the greater discord there is of heterogeneous and discordant drugs, the more true and beautiful, he says, will the black be, and the more capable of uniting with all other colours, without suppressing them, and even without making them tawney.

Dr Lewis acquaints us, that by mixing different blue, red, and yellow colours, he has not been able to produce a perfect black; but has often obtained from them very dark colours, such as may be called *brown-blacks*, or *grey-blacks*; such as we commonly see in the dark parts of paintings, and such as the charcoal and foot blacks appear when diluted a little. The ingredients being each of a dark deep colour is a very necessary condition; for bright blues, bright reds, and bright yellows, mixed in such proportions that neither colour prevailed, produced only a grey. In effect, all compositions of this kind, physically considered, can be no other than greys, or some of the intermediate tints between whiteness and darkness; and

these greys will be so much the lighter or darker, as the component colours of themselves are bright or dark.

Colour-making.

With regard to the extraction of the colouring matter from the different kinds of vegetables commonly to be met with of all colours, this would certainly be a very valuable acquisition, could the colours so procured be made durable. On this subject nothing hath yet appeared more satisfactory than what is delivered by Dr Lewis in his notes on Neuman's chemistry. His observations are curious, but promise very little success to any who shall attempt to fix these vegetable colours.

"Among the infinite variety of colours, (says he,) which glow in the flowers of plants, there are very few which have any durability, or whose fugitive beauty can be arrested by art, so as to be applied to any valuable purposes. The only permanent ones are the yellow: the red, the blue, and all the intermediate shades of purples, crimsons, violets, &c. are extremely perishable. Many of these flowers lose their colours on being barely dried; especially if they are dried slowly as has been usually directed, in a shady, and not warm place. The colours of all of them perish on keeping even in the closest vessels. The more hastily they are dried, and the more perfectly they are secured from the air, the longer they retain their beauty. The colouring matter extracted and applied on other bodies is still more perishable: oftentimes it is changed or destroyed in the hands of the operator.

"The colour of many blue flowers is extracted by infusion in water; but there are some from which water gains only reddish, or purplish blue. Of those that have been tried there is not one which gives any blue tincture to spirituous liquors: some give no colour at all, and some a reddish one. The juice pressed out from the fresh flowers is for the most part blue. The blue juices and infusions are changed red by all acids. The marine acid seems to strike the most florid red. The flowers themselves macerated in acid liquors, impart also a deep red tincture. Alkalies, both fixed and volatile, and lime-water, change them to a green. Those infusions of the juices, which have nothing of the native colour of the flowers, suffer the same changes from the addition of acid and alkaline liquors: even when the flowers have been kept till their colour is lost, infusions made from them acquire still a red colour from the one, and a green from the other, though in a less degree than when the flowers were fresh. The red colour produced by acids is scarcely more durable than the original blue: applied upon other bodies and exposed to the air, it gradually degenerates into a faint purplish, and at length disappears, leaving hardly any stain behind. The green produced by alkalies changes to a yellow, which does not fade so soon. The green, by lime-water, is more permanent and more beautiful: green lakes, prepared from these flowers by lime-water, have been used as pigments by the painter. The flowers of cyanus have been greatly recommended, as affording elegant and durable blue pigments; but I have never been able to extract from them any blue colour at all. They retain their colour indeed, when hastily dried, longer than some other blue flowers: but they com-

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Dr Lewis's experiments on vegetable colours.

Colour-
making.

communicate nothing of it to any kind of menstruum. Infusions of them in watery, spirituous, and oily liquors, are all of them more or less of a reddish cast, without any tendency to blue. Alum, which is said to heighten and preserve their blue colour, changes it, like that of other blue flowers, to a purplish red; acids to a deep red: alkalies and lime-water to a green: solution of tin added to the watery infusion, turns it of a fine crimson: on standing, a beautiful red *fecula* subsides, but it loses all its colour by the time it is dry. The watery infusion, inspissated to the consistence of an extract, appears of a dark reddish brown: an extract made with rectified spirit is of a purplish colour. The colour of both extracts spread thin and exposed to the air quickly fades. The flowers employed in these experiments were those of the common blue-bottle of the corn-fields.

“Red flowers readily communicate their own red colour to watery menstrua: among those that have been tried, there is not one exception. Those of a full red colour give to rectified spirit also a deep red tincture, brighter, though somewhat paler than the watery infusion: but the lighter red flowers, and those which have a tendency to purplish, impart very little colour to spirit, and seem to partake more of the nature of the blue flowers than of the pure red. Infusions of red flowers are supposed to be heightened by acids, and turned green by alkalies, like those of the blue; but this is far from being universal. Among those I have examined, the rose-colours and purplish reds were changed nearly in the same manner as the blues; but the full deep reds were not. The deep infusion of red poppies is changed by alkalies, not to a green, but to a dusky purple.

“The colours of yellow flowers, whether pale or deep, are in general durable. Many of them are as much so, perhaps, as any of the native colours of vegetables. The colour is extracted both by water and by spirit. The watery infusions are the deepest. Neither alkalies nor acids alter the species of the colour, though both of them vary its shade; acids rendering it paler, and alkalies deeper: alum likewise considerably heightens it, though not so much as alkalies. An infusion of the flowers, made in alkaline ley, precipitated by alum, gives a durable yellow lake. In some of the deep reddish yellow, or orange-coloured flowers, the yellow matter seems to be of the same kind with that of the pure yellow flowers, but the red to be of a different kind from the pure red ones; watery menstrua take up only the yellow, and leave the red, which may afterwards be extracted by rectified spirit of wine, or by water acuated by fixed alkaline salt. Such particularly are the saffron-coloured flowers of *carthamus*. These, after the yellow matter has been extracted by water, are said to give a red tincture to ley; from which on standing at rest for some time, a deep bright red *fecula* subsides; called for one of the names of the plant which produces it, *safflower*; and from the countries whence it is commonly brought to us, *Spanish-red*, and *China-lake*. This pigment impregnates spirit of wine with a beautiful red tincture, but communicates no colour to water. I have endeavoured to separate by the same treatment, the red matter of some of the other reddish yellow flowers,

as those of garden marigold, but without success. Plain water extracted a yellow colour, and alkaline ley extracted afterwards only a paler yellow: though the digestions were continued till the flowers had lost their colour, the tinctures were no other than yellow, and not so deep as those obtained from the pure yellow flowers. The little yellow *stoculi*, which in some kinds of flowers, are collected into a compact round disc, as in the daisy and corn-marigold, agree so far as they have been examined, with the expanded yellow petals. Their colour is affected in the same manner by acids, by alkalies, and by alum; and equally extracted by water and by spirit. But the yellow farina, or fine dust, lodged on the tips of the stamina of flowers, appears to be of a different kind. It gives a fine bright yellow to spirit, and a duller yellow to water; the undissolved part proving in both cases of a pale yellowish white. Both the watery and spirituous tinctures were heightened by alkaline liquors, turned red by acids, and again to a deep yellow on adding more of the alkali: I know no other vegetable yellow that is turned red by acids.

“White flowers are by no means destitute of colouring matter. Alkaline lixivia extract from some of them a green tincture, and change their colourless expressed juices to the same colour; but I have not observed, that they are turned red by acids. The flowers of the common wild convolvulus or bind-weed, which in all their parts are white, give a deep yellow or orange tincture to plain water; which, like the tinctures of flowers that are naturally of that colour, is rendered paler by acids, heightened a little by alum, and more considerably by alkaline salts. The vapours of the volatile vitriolic acid, or of burning sulphur, which whiten or destroy the colour of the coloured flowers, make no change in the white.

“The red juices of fruits, as currants, mulberries, elder-berries, morello and black cherries, &c. gently inspissated to dryness, dissolve again almost totally in water, and appear nearly of the same red colour as at first. Rectified spirit extracts the tingling particles, leaving a considerable portion of mucilaginous matter undissolved; and hence the spirituous tincture proves of a brighter colour than the watery. The red solutions, and the juices themselves, are sometimes made dull and sometimes more florid, by acids, and generally turned purplish by alkalies. The colours of these juices are for the most part perishable. They resist, indeed, the power of fermentation, and continue almost unchanged, after the liquor has been converted into wine, but when the juice is spread thin upon other bodies, exsiccated, and exposed to the air, the colour quickly alters and decays: the bright lively red change the soonest: the dark dull red stain from the juice of the black cherry, is of considerable durability. The fruit of the American *opuntia* or prickly pear, the plant upon which the cochineal insect is produced, is perhaps an exception: This bright red fruit, according to Labat, gives a beautiful red dye. Some experiments, however, made upon the juice of that fruit, as brought into England, did not promise to be of any great advantage: but the particulars I cannot now recollect.

“The ripe berries of buckthorn stain paper of a green

Colour-
making.35
Colours
from fruits.

Colour-
making.

green colour. From these is prepared the substance called *sap-green*, a pigment sufficiently durable, readily soluble in water, but not miscible with oil. The berries dried while green, and macerated in alum-water, are said to yield a yellow pigment; and when they have grown over ripe so as to fall off spontaneously, a purple one. It is said that the berry of the *heliotropium tricoctum*, which grows wild about Montpellier, stains paper of a green colour, and that this green turns presently to a blue: that the common blue paper receives its colour from this juice: and that the red rags called *turnsol*, employed for colouring wines and other liquors, are tintured by the same juice turned red by acids. According to M. Nisolle of the French academy of sciences (as quoted by Savary in his *Dictionnaire de Commerce*), the colouring juice is obtained, not from the berries, but from tops of the plant gathered in August, ground in mills, and then committed to the press. The juice is exposed to the sun about an hour, the rags dip in it, dried in the sun, moistened by the vapour which arises during the flaking of quicklime with urine, then dried again in the sun, and dipped again in the juice. The Dutch and others are said to prepare *turnsol* rags, and *turnsol* in the mals, from different ingredients, among which archil is a principal one.

"In some plants, peony for instance, the seeds at a certain point of maturity are covered with a fine shining red membrane. The pellicles of the seeds of a certain American tree afford the red masses brought into Europe under the names of *annatto*, *orlean*, and *roucou* *. Mr Pott, in the Berlin Memoirs for the year 1752, mentions a very extraordinary property of this concrete. 'With the vitriolic acid it produces a blue colour, of extreme beauty; but with this capital defect, that all salts and liquors, and even common water, destroy it.' The specimen of *annatto*, which I examined, was not sensibly acted upon by spirit of vitriol; it received no change in its own colour, and communicated none to the liquor. Nor did any visible change ensue upon dropping the acid into tinctures of *annatto* made in water, or in spirit.

"The green colour of the leaves of plants is extracted by rectified spirit of wine and by oils. The spirituous tinctures are generally of a fine deep green, even when the leaves themselves are dull-coloured, or yellowish, or hoary. The colour, however, seldom abides long even in the liquor; much less when the tinging matter is separated in a solid form, and exposed with a large surface to the air. The editor of the Wirtemberg Pharmacopœia observes, that the leaves of *acanthus*, *brankurine*, or *bear's-breach*, give a more durable green tincture to spirit than those of any other herb. Alkalies heighten the colour both of the tinctures and green juices; acids weaken, destroy, or change it to a brownish: lime-water improves both the colour and durability: by means of lime, not inelegant green lakes are procurable from the leaves of *acanthus*, lily of the valley, and several other plants. There are very few herbs which communicate any share of their green colour to water; perhaps none that give a green of any considerable deepness. It is said, however, that the leaves of some plants give a green dye to woolen, without the

addition of any other colouring matter; particularly those of the wild chervil, or cow-weed, the common ragwort, and devil's-bit. The leaves of many kinds of herbs and trees give a yellow dye to wool or woolen cloth that has been previously boiled with a solution of alum and tartar. Weld, in particular, affords a fine yellow, and is commonly made use of for this purpose by the dyers, and cultivated in large quantity in some parts of England. There is no colour for which we have such plenty of materials as for yellow. Mr Hellot observes, that all leaves, barks and roots, which on being chewed, discover a slight astringency, as the leaves of the almond, peach, and pear-trees, ash-bark, (especially that taken off after the first rising of the sap in the spring), the roots of wild patience, &c. yield durable yellows, more or less beautiful according to the length of time that the boiling is continued, and the proportions of alum and tartar in the preparatory liquor; that a large quantity of alum makes these yellows approach to the elegant yellow of weld; that if the tartar is made to prevail, it inclines then to an orange: that if the roots, barks, or leaves, be too long boiled, the yellow proves tarnished, and acquires shades of brown." See the article DYEING.

The most capital preparations from the leaves of plants, are those of indigo and weld; which are both very much used in dyeing, though the first only in painting *. Both the indigo and woad plants give out their colour, by proper management, to water, in form of a blue fecula or lake. Mr Hellot suspects that a like blue fecula is procurable from many other vegetables. Blue and yellow blended together, compose a green. He supposes the natural greens in vegetables to be compounded in like manner of these two colours; and that the blue is oftentimes the most permanent, so as to remain entire after the putrefaction or destruction of the yellow. The theory is specious, and perhaps just: we know of no other that accounts in any degree for the production of the indigo and woad blue. Dr Lewis, however, informs us, that he never was able to produce the least appearance of either blue or yellow from any of the plants he tried by treating them in the manner used for the preparation of indigo.

There are sundry mosses, which in their natural state, like the indigo and woad plants, promise nothing of the elegant colours that can be extracted from them by art. The most remarkable of these is *archil*, for the preparation of which, and the colours that may be produced from it, see the article. Linnæus suspects that there are several other more common mosses from which valuable colours might be extracted: a quantity of sea-moss, having rotted in heaps on the shore, he observed the liquor in the heaps to be as red as blood; the sea-water, the sun, and the putrefaction, having brought out the colour. Mr Kalm, in an appendix to Linnæus's paper in 1745, mentions two sorts of mosses actually employed in Sweden for dyeing woolen red: one is the *Lichenoides coralliforme apicibus coccineis* of Ray's Synopsis; the other the *Lichenoides tartareum*, *farinaceum*, *scutellarium umbone fusco*, of Dillenius. This last is a white substance like meal clotted together, found on the sides

Colour-
making.* See indigo
and woad..37
Production
of indigo
accounted
for.38
Colours
from
mosses.* See An-
natto.36
Colours
from
leaves.

Colour-
making.

Colouring
1
Colt.
39
Colours
from roots.

and tops of hills. It is shaved off from the rocks after rain, purified from the stony matters intermixed among it by washing with water, then dried in the sun, ground in mills, and again washed and dried: it is then put into a vessel with urine, and set by for a month: a little of this tincture added to boiling water makes the dyeing liquor. In the same transactions for the year 1754, there is an account of another moss, which, prepared with urine, gives a beautiful and durable red or violet dye to wool and silk. This is the lichen foliaceus umbilicatus fustus lacunensis, Linn. flor. Suec. It grows upon rocks, and is readily distinguishable from others of that class, by looking as if burnt, or parched, consisting of leaves as thin as paper, convex all over on the upper side, with corresponding cavities underneath, adhering firmly to the stones by a little root under the leaves, and coming asunder, when dry, as soon as touched. It is gathered after rain, as it then holds best together, and parts easiest from the stone. In France, a crustaceous moss, growing upon rocks in Auvergne, is prepared with lime and urine, and employed by the dyers as a fucedaneum for the Canary archil, to which it is said to be very little inferior. Mr Hellot relates, that he has met with several other mosses, which, on being prepared in the same manner, acquire the same colour. The most expeditious way, he says, of trying whether a moss will yield an archil or not, is to moisten a little of it with a mixture of equal parts of spirit of salt ammoniac and strong lime-water, and add a small proportion of crude sal ammoniac. The glass is then to be tied over with a piece of bladder, and set by for three or four days. If the moss is of the proper kind, the little liquor which runs from it upon inclining the vessel, will appear of a deep crimson colour; and this afterwards evaporating, the plant itself acquires the same colour. Dr Lewis informs us that he has tried a good number of the common mosses, many both of the crustaceous and foliaceous kind, and not a few of the fungi; as also the herbs chamomile and milfoil, which yield a blue essential oil; and thyme, whose oil becomes blue by digestion with volatile spirits; but never met with any that yielded a colour like archil. Most of them gave a yellow or reddish brown tincture. A few gave a deep red colour to the liquor: but, when diluted, it shewed a yellowish cast, and when applied on cloth it gave only a yellowish red.

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Some blue
flowers may
probably
yield per-
manent co-
lours.

To these observations we shall only add, that though, in general, the blue colours of flowers are exceedingly perishable, there seem to be at least two exceptions to this rule; for the blue flowers of iris, or flower-de-luce, and those of columbine, when treated with solution of tin yielded a colour tolerably permanent. Indeed, when experiments are made with a view to extract the colour from any part of a vegetable, it will always be proper to try whether it can bear a mixture with this solution. If the colour is not destroyed by it, there is a very great probability that the solution will, by proper management, preserve, and give a durability to it, which could scarce be obtained by any other method. It must, however, be observed, that there are several substances used in colour-making, which solution of tin cannot bear to be mixed

with. These are principally fugar of lead and cream of tartar, as well as all the calcareous earths and alkaline salts. With alum it may be mixed very safely, and is in many cases the better for it. The roots of plants, however, seem to promise more durability of colour than the upper parts. We have seen a blue colour of considerable durability and brightness prepared from the roots of common radishes by expressing the juice, combining it with tobacco-pipe clay, and brightening it with a little alum. The root of the red beet is also said to yield a durable colour of a beautiful red, inclining to scarlet; but this we cannot affirm from our own experience.

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Colours
for maps.

With regard to liquid colours for maps, &c. we apprehend there can be very little difficulty of preparing all the possible varieties of them, if what we have above laid down is attended to. The only colour with which there can be any difficulty is blue; but the common solutions of indigo in alkalies or acids may be made to answer this purpose, though, on account of their strongly saline quality, they are not very proper. A very curious method of procuring a beautiful transparent blue colour is by extracting the colouring matter from Prussian blue, by means of a caustic alkali. This when laid upon paper appears of a dirty brown colour; but if washed over with a weak solution of green vitriol, is instantly changed to a most beautiful blue. This seems to afford a method of procuring blue transparent colours of greater beauty than they are usually met with.—See specimens of transparent colours prepared according to the above rules, on the Chart (subjoined) to HISTORY.

COLOURING, among painters, the manner of applying and conducting the colours of a picture; or the mixtures of light and shadows, formed by the various colours employed in painting. See PAINTING.

COLOURING of Glass. See GLASS.

COLOURING of Porcelain. See PORCELAIN.

COLT, in zoology, a general name for the young of the horse-kind: the male being likewise, for distinction's sake, called a *horse-colt*; the female, a *filly*.

After the colts have been foaled, you may suffer them to run with the mare till about Michaelmas, sooner or later, according as the cold weather comes in; then they must be weaned; though some persons are for having them weaned after Martinmas, or the middle of November. The author of the *Complete Horseman* is of opinion, that the reason why most foals advance so slowly, and are not capable of service till they are six or seven years old, is because they have not sucked long enough; whereas, if they had sucked the whole winter over, they would be as good at four or five years old, as they are now at eight.

They ought now to be kept in a convenient house, with a low rack and manger for their hay and oats, which must be sweet and good; with a little wheaten bran mixed with the oats to cause them to drink, and to keep their bodies open. But, since there are some who allege that oats make foals become blind, or their teeth crooked: the same author is of opinion, that oats will wear their teeth, and make them the sooner to change, and also to raze; therefore he judges it to be the best way to break them in a mill, because that by endeavouring with their jaws to bruise

and

Colt.

and chew them, they stretch and swell their eye and nether-jaw veins, which so attract the blood and humours that they fall down upon the eyes, and frequently occasion the loss of them: so that it is not the heating quality of the oats, but the difficulty in chewing, that is the cause of their blindness.

Further, colts thus fed with grain do not grow thickish upon their legs, but grow broader and better knit than if they had eaten nothing but hay and bran, and will endure fatigue the better. But above all they must be kept from wet and cold, which are hurtful to them, nothing being more tender than they are. For proof of this, take a Spanish Stallion, and let him cover two mares, which for age, beauty, and comeliness may admit of no difference between them; and if they produce both horse-colts, or both fillies, which is one and the same thing, let one run abroad, and the other be housed every winter, kept warm, and ordinarily attended; and that colt that has been kept abroad shall have large fleshy shoulders, flabby and gouty legs, weak pasterns, and ill hoofs; and shall be a dull heavy jade, in comparison to the other which is housed, and orderly kept; and which will have a fine forehead, be fine shaped, and have good legs and hoofs, and be of good strength and spirit: by which you may know, that to have the finest stallion, and the beautifullest mare, is nothing if they are spoiled in the breeding up. It is worth observation, that some foals, under six months old, though their dams yield plenty of milk, yet decay daily, and have a cough, proceeding from certain pellicles or skins that breed in their stomachs, which obstruct their breathing, and at last destroy them entirely. To remedy this malady, take the bag wherein the colt was foaled, dry it, and give him as much of it in milk as you can take up with three fingers: but if you have not preserved the bag, procure the lungs of a young fox, and use it instead of the aforesaid powder.

It will be proper to let the colts play an hour or two in some court-yard, &c. when it is fair weather, provided you put them up again carefully, and see that they take no harm. When the winter is spent, turn them into some dry ground, where the grass is short and sweet, and where there is good water, that they may drink at pleasure: for it is not necessary that a colt should fill his belly immediately, like a horse that labours hard. The next winter you may take them into the house, and use them just as you do your other horses; but let not your horse-colts and fillies be kept together after the first year. This method may be observed every summer and winter till you break them, which you may do after they have been three years old; and it will be a very easy thing if you observe the aforesaid method of housing them: for ordering them the second year as you do your other horses, they will be so tame and gentle, that you need not fear their leaping, plunging, kicking, or the like; for they will take the saddle quietly. As for all those ridiculous methods of beating and cowing them, they are in effect spoiling them, whatever they call it, in ploughed fields, deep ways, or the like; instead of which, let the rider strive to win them by gentle usage, never correcting them but when it is necessary, and then with judgment and moderation.

Colt.

You will not need a cavesson of cord, which is a head strain, nor a pad of straw; but only a common saddle, and a common cavesson on his nose, such as other horses are ridden with; but it ought to be well lined with double leather; and if you please you may put on his mouth a watering bit, but without reins, only the head-stall, and this but for a few days; and then put on such a bit as he should be always ridden with: and be sure not to use spurs for some time after backing. Take notice, that as yearlings must be kept a-broad together, so those of two years old together; the like for those of three yearlings, which ordering is most agreeable to them.

In order to make him endure the saddle the better, the way to make it familiar to him will be by clapping the saddle with your hand as it stands upon his back, by striking it, and swaying upon it, dangling the stirrups by his sides, rubbing them against his sides, and making much of him, and bringing him to be familiar with all things about him; as straining the crupper, fastening and loosening the girths, and taking up and letting out the stirrups. Then as to the motion of him, when he will trot with the saddle obediently, you may walk a trench of a full mouth, and put the same into his mouth, throwing the reins over the forepart of the saddle, so that he may have a full feeling of it; then put on a martingale, buckled at such a length that he may but just feel it when he jerks up his head; then take a broad piece of leather, and put it about his neck, and make the ends of it fast by plating of it, or some other way, at the withers, and the middle part before his weald, about two handbuls below the thropple, betwixt the leather and his neck; let the martingale pass so, that when at any time he offers to duck, or throw down his head, the cavesson being placed upon the tender gristle of his nose, may correct and punish him; which will make him bring his head to, and form him to an absolute rein: trot him abroad, and if you find the reins or martingale grow slack, straiten them, for when there is no feeling there is no virtue.

Colt-Evil, among farriers. See **FARRIERY**, § xxviii. 4.

Colt-Taming, is the breaking of a colt so as to endure a rider. Colts are most easily broke at three or four years of age; but he who will have patience to see his horse at full five, will have him much more free of diseases and infirmities than if he was broke sooner.

Preparatory to their breaking for the saddle, they should be used to familiar actions, as rubbing, clawing, haltering, leading to water, taking up their feet, knocking their hoofs, &c. In order to bridle and saddle a colt, when he is made a little gentle, take a sweet watering trench, washed and anointed with honey and salt, which put into his mouth, and so place it that it may hang about his ruff; then offer him the saddle, but take care not to fright him with it. Suffer him to smell at it, to be rubbed with it, and then to feel it; after that, fix it and gird it fast; and make that motion the most familiar to him to which he seems most averse. Being thus saddled and bridled, lead him out to water and bring him in again: when he has stood reined upon the trench an hour or more, take

take off the bridle and saddle, and let him go to his meat till the evening, and then lead him out as before : and when you carry him in again to set him up, take off his saddle gently, clothing him for all the night.

COLTIE, a term used by timber-merchants, for a defect or blemish in some of the annular circles of a tree, whereby its value is much diminished.

COLUBER, in zoology, a genus of serpents belonging to the order of amphibia. The characters are these : they have a number of scuta, or hard crusts on the belly ; and scutellæ, or scales on the tail. Linnæus enumerates no less than 97 species under this name, distinguished solely by the number of scuta and scutellæ. The most remarkable are the following.

1. The *Vipera*, or common viper of the shops, has 118 scuta, and only 22 scutellæ. The body is very short, and of a pale colour, with brownish spots ; and the head is gibbous, and covered with small scales. It is a native of Egypt, and other warm countries. It has always been remarkable for its poisonous nature ; inasmuch that vipers, when numerous, have often been thought the ministers of divine vengeance, like the plague, famine, and other national calamities. A notion also prevailed among the ancients, that few or none of the parts of a viper were free from poison ; for which reason they made no experiments or discoveries concerning the nature of these creatures. It is now, however, proved, by undoubted experiments, that the poison of vipers, as well as of all other serpents whose bite is hurtful, lies in a bag at the bottom of their two greater teeth or fangs. These teeth are perforated ; and when the creature bites, the compression of the bag forces out a little drop of the poison into the wound, where it produces its mischievous effects. Dr Mead has given a curious anatomical dissertation on those parts of a viper which have any connection with its poison, by which the truth of the above mentioned position is ascertained beyond a doubt. With regard to the poison itself, Dr Mead says its quantity is so inconsiderable, that one good drop does all the execution. When viewed through a microscope, the liquor had a saline appearance. At first he perceived only a quantity of minute salts nimbly floating here and there : but in a very short time the appearance was changed ; and these saline particles were now shot out into crystals of extreme tenuity and sharpness, with something like knots here and there, from whence they seemed to proceed : so that the whole texture did, in some measure, resemble a spider's web, though infinitely finer. He made various experiments in order to determine the quality and species of these crystals, but without effect. Half an ounce of human blood, newly drawn, was not visibly altered, either in colour or consistence, by a mixture with the poison. It then was, and remained, undistinguishable from the same blood taken into another glass in which there was no poison. These portions of blood were severally mixed with acids and alkalis : the envenomed blood was, after such mixtures, of the same colour and consistence with the other. Spirit of nitre, spirit of salt, and juice of lemons, severally poured upon the sanies itself, produced neither fermentation, nor any change of colour.

Oleum tartari per deliquium, and the simple spirit of hartshorn, dropped upon the poison, neither altered its colour, nor raised any ebullition. Syrup of violets mixed with the poison did not change its colour either to red or green. The tincture of heliotropium, that is blue paper, was not altered by the sanies ejected upon it : and this drying still retained its yellowish colour. These experiments were tried by Dr Mead, in presence of a number of gentlemen. They ended their inquiries by tasting the poisonous liquor. Having diluted it with a little warm water, several of them ventured to touch it with the tip of their tongues. They all agreed that it tasted very sharp and fiery, as if the tongue had been struck through with something scalding or burning. This sensation went not off in two or three hours ; and one gentleman who would not be satisfied without trying a large drop undiluted, found his tongue swelled with a little inflammation, and the soreness lasted two days ; but without any farther inconvenience. The purpose answered by this poisonous liquor to the creatures themselves, is probably the destruction of their prey ; for as serpents frequently feed upon animals of very considerable magnitude and strength, they would often undoubtedly make their escape, did not the poisonous juice instilled into the wounds made by the serpent's teeth almost instantly deprive them of life, or at least of all power to struggle with their enemy. For an account of the symptoms produced by the bites of vipers and other venomous serpents in the human body, together with the best methods of cure, see the *Index* subjoined to *MEDICINE*. After the viper is deprived of these bags which contain its poison, it is entirely harmless : nay the flesh of it is highly nutritive, and justly esteemed a great restorative. It hath been much recommended in scrophulous, leprosy, and other obstinate chronic disorders ; but, to answer any good purpose, it must undoubtedly be used for a considerable time as food. The dried flesh which comes to this country from abroad, is justly esteemed by Dr Lewis to be totally insignificant. A volatile salt was formerly drawn from vipers, and sold at a great price, as a sovereign remedy against the bites of vipers and other poisonous animals ; but it is now found not to be materially different from the volatile alkaline salts procured by distilling other animal substances.

2. The *berus*, or common British viper, is found in many countries of Europe. They swarm in the *Hebrides*, or western British isles, and abound in many parts of Britain ; particularly in the dry, stony, and chalky counties. According to Mr Pennant and other naturalists, they are viviparous, but proceed from an internal egg ; being of that class of animals of whose generation Aristotle says, " They conceive a perfect egg within, but bring forth their young alive." This species is far from being prolific ; 11 eggs being the utmost that were ever heard of in one viper. These eggs are, as it were, chained together ; and each about the size of the egg of a black-bird. This viper seldom grows longer than two feet ; though Mr Pennant tells us he once saw a female (which is nearly a third larger than the male) almost three feet long. The ground colour of this serpent is of a dirty yellow, that of the female deeper. Its back is marked the

whole

Coluber.

whole length with a series of rhomboidal black spots, touching each other at the points; the sides with triangular ones; the belly entirely black. It hath 146 scuta, and 39 scutellæ. There is a variety wholly black; but the rhomboid marks are very conspicuous even in this, being of a deeper and more glossy hue than the rest. The head of the viper, says Mr Pennant, is inflated, which distinguishes it from the common snake. Mr Catelby assures us, that the difference between the vipers and other serpents is, that "the former have long hollow fangs, or tusks, with an opening near the point; the neck is small, the head broad, the cheeks extending wide, scales rough, the body for the most part flat and thick; they are slow of motion; swell the head and neck when irritated, and have a terrible and ugly aspect." The tongue is forked, the teeth small; the four canine teeth are placed two on each side the upper jaw: these instruments of poison are long, crooked, and moveable; capable, like those of the former species, of being raised or depressed at the pleasure of the animal, and they infill their poison in the same manner. The vipers are said not to arrive at their full growth till they are six or seven years old; but they are capable of engendering at two or three. They copulate in May, and go about three months with their young. Mr Pennant tells us, that he has been assured of a fact mentioned by Sir Thomas Brown*, who was far from being a credulous writer, that the young of the viper, when terrified, will run down the throat of the parent, and seek for shelter in its belly, in the same manner as the young of the opossum retire into the ventral pouch of the old one. From this some have imagined that the viper is so unnatural as to devour its own young; but this assertion deserves no credit; it being well known that the food of these serpents is frogs, toads, lizards, mice, and, according to Dr Mead, even an animal so large as a mole. These they swallow entire; which, if we consider the narrowness of their neck, shews it capable of a distension hardly credible, had we not ocular proofs of the fact. It is also said, from good authority, that they will prey on young birds; but whether on such as nestle on the ground, or whether they climb up trees for them, as the Indian serpents do, is quite uncertain: the fact, however, is very far from being recent; for Horace tells us,

*Ut affdens impluvibus pullis avis
Serpentum allapsis timet.* EPOD. I.

Thus for its young the anxious bird

The gliding serpent fears.

The viper is capable of supporting very long abstinence; it being known, that some have been kept in a box six months without food, and yet did not abate of their vivacity. They feed only a small part of the year, but never during their confinement; for if mice, their favourite diet, should at that time be thrown into their box, though they will kill, yet they never will eat them. The violence of their poison decreases in proportion to the length of their confinement, as does also the virtue of their flesh whatever it is. The animals, when at liberty, remain torpid throughout the winter; but, when confined, have never been observed to take their annual repose. The method of catching them is by putting a cleft stick on

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or near their head; after which they are seized by the tail, and instantly put into a bag. The viper-catchers are very frequently bit by them in the pursuit of their business, yet we very rarely hear of their bite being fatal. Salad oil, if applied in time, is said to be a certain remedy*. The flesh of the British viper has been celebrated as a restorative, as well as that of the foreign kind. Mr Keyler relates, that Sir Kenelm Digby used to feed his wife, who was a most beautiful woman, with capons fattened with the flesh of vipers.

3. The punctatus of Linnæus, by Mr Catelby called the *water-viper*, is a native of Carolina. According to Linnæus it is ash-coloured, variegated with yellow spots. Mr Catelby informs us, that the head and back of this serpent are brown; the belly marked transversely with yellow, and also the sides of the neck. The neck is small, the head large, and the mouth armed with the destructive fangs of the viper or rattle-snake, next to which it is reckoned the largest serpent in this country. Contrary to what is observed in most other vipers, these are very nimble and active, and very dextrous in catching fish. In summer, great numbers are seen lying on the branches of trees hanging over rivers; from which, on the approach of a boat, they drop into the water, and often into the boat on the mens heads. They lie in wait in this manner to surprise either birds or fish: after the latter they plunge with surprising swiftness, and catch some of a large size, which they bring ashore and swallow whole. The tail of this animal is small towards the end, and terminates in a blunt horny point about half an inch long. This harmless little horn hath been the occasion of many terrible reports; as, that by a jerk of its tail, the animal is capable of instantly destroying both men and beasts; that a tree struck with this terrible horn, in a short time grows black, withers, and dies, &c. but all these Mr Catelby assures us have not the least foundation in fact.

4. The chersea is a native of Sweden, where it is called *asping*. It is a small reddish serpent, whose bite is said to be mortal. Concerning this species Mr Pennant asks, "Is it possible that this could be the species which has hitherto escaped the notice of our naturalists? I rather suspect it, as I have been informed that there is a small snake that lurks in the low grounds of Galloway, which bites and often proves fatal to the inhabitants."

5. The prester of Linnæus, or black viper of Mr Catelby, is a native of Carolina and Virginia. It is short and thick, slow of motion, spreads its head surprisingly when irritated, very flat and head, threatening with a horrid hiss. They are very poisonous; their bite being as deadly as that of the rattle-snake. They frequent the higher lands, and are of a rusty black colour.

6. The coluber luridus of Forster, called by Mr Catelby the *brown viper*; is a native of the same countries with the preceding. It is about two feet long, and large in proportion; very slow in its motion, even when threatened with danger: notwithstanding which, it defends itself very fiercely when attacked, and its bite is as venomous as any. They prey upon eels, lizards, and other animals of that kind.

Coluber.

* See (the Index sub-joined to) Medicine.

* *Vulgar Errors*, p. 114.

Coluber.

Besides these species of which we have a particular description, the following are also reckoned among the poisonous serpents, viz. 7. The atropus, with 131 scuta and 22 scutellæ. It is a native of America, the body white, and the eyes brown, with a white iris. 8. The leberis, with 110 scuta and 50 scutellæ, is a native of Canada, and has many black linear rings. 9. The ammodites, with 142 scuta and 32 scutellæ, is a native of the East. It is about six inches long, and has a fleshy protuberance on its nose. 10. The aspis, with 146 scuta and 46 scutellæ, is a native of France; and is of a reddish colour, with dusky spots on the back. 11. The lebetinus, with 155 scuta and 46 scutellæ, is a native of Asia, and is of a cloudy colour, with red spots on the belly. 12. The feverus, with 170 scuta and 42 scutellæ, is likewise a native of Asia, and is ash-coloured with white belts. 13. The stolaus, with 143 scuta and 76 scutellæ, is a native of Asia; and is of a greyish colour, with two white filets. 14. The lacteus, with 203 scuta and 22 scutellæ, is a native of the Indies. Its colour is white, with black spots. 15. The naja, with 193 scuta and 60 scutellæ, is a native of the East Indies, and is reckoned the most poisonous of all serpents. It is killed by the ichneumon. 16. The atrox, with 196 scuta and 69 scutellæ, is a native of Asia. It is of a hoary colour, and the head is compressed and covered with small scales. 17. The nivens, with 209 scuta and 62 scutellæ, is a native of Africa. It is white, and without any spots. 18. The corallinus, with 193 scuta and 82 scutellæ, is a native of Asia. It is greyish, with three brown filets. 19. The diplas, with 152 scuta and 135 scutellæ, is a native of America. It is of a bluish colour, with the margins of the scales white. 20. The mycterizans, with 192 scuta and 167 scutellæ, is a native of America. It hath a stretched out triangular snout.

The above 20 species are all the serpents of the genus of coluber that are reckoned poisonous. Of the rest we shall only mention the following, which are the most remarkable.

21. The erythrogaster of Forster, called by Mr Catesby the *copper-bellied snake*, is a native of Carolina, and grows sometimes near to the size of a rattlesnake. It is of a brown colour in all parts of its body, except the belly which is of a red copper colour. They frequent water, and probably prey on fish; but they will also devour birds and such other animals as they are able to overcome. They are bold and active, frequently entering poultry-houses, devouring the fowls and sucking their eggs.

22. The constrictor, or black snake, is a native of several parts of America. They are very long, sometimes measuring six feet, and are all over of a shining black. They are the most numerous of all; and are very bold and furious, leaping at and biting those that attack them. It is commonly said, that they will attack and devour rattlesnakes. This Mr Catesby says he cannot affirm as truth from his own experience; but assures us, that large serpents of any species will very often swallow the smaller ones indiscriminately. The black snakes are preserved on account of their dexterity in destroying rats; which animals they pursue to their hiding places in the roofs of houses, &c. with wonderful agility.

Coluber
Columba.

23. The annulatus, or little brown bead-snake, is always small, and is seldom found above ground, but commonly dug up, and found twisting about the roots of shrubs and plants. All the back and other parts of the body have transverse spots of brown and white so disposed as to have some resemblance to a string of English beads; whence probably it takes its name. It is quite harmless, and is a native of Virginia and Carolina.

24. The flagellum, or coach-whip snake, is of a brown colour, very long, slender, and active. It runs swiftly, and is quite inoffensive; but the Indians imagine it is able to cut a man in two with a jerk of its tail.

25. The fulvius, or corn-snake, is beautifully marked with red and white, resembling a species of Indian corn, whence its name. It is harmless as to its bite, but frequently robs hen-roosts.

26. The æstivus, or green snake, is all over of a green colour; it is of a small size, and easily becomes tame and familiar, inasmuch that some people will carry them in their bosom.

27. The fasciatus, or wampum snake, derives its name from its resemblance to the Indian wampum. It sometimes grows to the length of five feet; and, like other large snakes, is very voracious, but its bite is not venomous. The back is of a dark blue, the belly finely clouded with spots of a brighter blue; the head is small in proportion to the rest of the body.

COLUMBA, the PIGEON, in ornithology, a genus belonging to the order of passeræ. The characters of this genus are as follow: The bill is straight, and descends towards the point; the nostrils are oblong, and half covered with a soft tumid membrane; and the tongue is entire, i. e. not cloven. There are 40 species, all natives of different countries. The following are the most remarkable.

1. The ænas, or domestic pigeon, and all its beautiful varieties, derive their origin from one species, the *stock-dove*; the English name implying its being the stock or stem from whence the other domestic birds spring. These birds, as Varro observes, take their Latin name, *columba*, from their voice or cooing; and, had he known it, he might have added the British also; for *k'lommen*, *kylubman*, *kulm*, and *kolm*, signify the same bird. They were, and still are, to be found in most parts of our island in a state of nature; but probably the Romans first taught the Britons how to construct pigeon-houses, and make the birds domestic. The characters of the domestic pigeon are the following. It is of a deep bluish ash-colour; the breast dashed with a fine changeable green and purple; the sides of the neck with shining copper-colour; its wings marked with two black bars, one on the coverts of the wings, the other on the quill feathers; the back white, and the tail barred near the end with black. They weigh 14 ounces. In the wild state it breeds in holes of rocks and hollows of trees; for which reason some people stile it *columba cavernalis*, in opposition to the ring-dove, which makes its nest on the boughs of trees. Nature always preserves some agreement in the manners, characters, and colours of birds reclaimed from their wild state. This species of pigeon soon takes to build in artificial cavities, and from the temptation of a ready provision becomes easily domesticated. Multitudes of these wild birds

are

Columba.

are observed to migrate into the south of England : and, while the beech-woods were suffered to cover large tracts of ground, they used to haunt them in myriads, reaching in strings a mile in length, as they went out in the morning to feed. They visit Britain the latest of any bird of passage, not appearing till November, and retiring in the spring. Mr Pennant imagines, that the summer haunts of these creatures are in Sweden, as Mr Eckmark makes their retreat thence coincide with their arrival in Britain. Numbers of them, however, breed on cliffs of the coast of Wales, and of the Hebrides. The varieties produced from the domestic are very numerous, and extremely elegant ; they are distinguished by names expressive of their several properties, as *tumblers, carriers, jacobines, croppers, pouters, runts, turbits, owls, nuns*, &c. The most celebrated of these is the carrier, of which an account is already given under the article *CARRIER-Pigeon*. The nature of pigeons is to be gregarious ; to lay only two eggs, and to breed many times in the year. So quick is their increase, that the author of the "Oeconomy of Nature" observes, that in the space of four years, 14,760 pigeons may come from a single pair. They bill during their courtship : the male and female sit, and also feed their young, by turns : they cast provision out of their craw into the young ones mouth ; and drink, not by sipping, like other birds, but by continued draughts like quadrupeds ; and have mournful or plaintive notes.

2. The palumbus, or ring-dove is a native of Europe and Asia. It is the largest pigeon we have, and might be distinguished from all others by its size alone. Its weight is about 20 ounces ; its length 18, the breadth 30 inches. The head, back, and covers of the wings are of a bluish ash-colour : the lower side of the neck and breast are of a purplish red, dashed with ash-colour : on the hind part of the neck is a semi-circular line of white ; above and beneath that, the feathers are glossy, and of changeable colours as opposed to the light. This species forms its nest of a few dry sticks in the boughs of trees. Attempts have been made to domesticate them by hatching their eggs under the common pigeon in dove-houses ; but as soon as they could fly, they always take to their proper haunts. In the beginning of winter they assemble in great flocks, and leave off cooing, which they begin in March when they pair.

3. The turtur, or turtle-dove, is a native of India. The length is twelve inches and a half ; its breadth 21 ; the weight four ounces. The irides are of a fine yellow, and the eye-lids encompassed with a beautiful crimson circle. The chin and forehead are whitish ; the top of the head ash-coloured, mixed with olive. On each side of the neck is a spot of black feathers prettily tipped with white : the back ash-coloured, bordered with olive brown : the scapulars and covers of a reddish brown spotted with black : the breast of a light purplish red, having the verge of each feather yellow : the belly white. The tail is three inches and a half long ; the two middle feathers of a dusky brown ; the others black, with white tips ; the end and exterior side of the outmost feathers wholly white. In the breeding season these birds are found in Buckingham-shire, Gloucester-shire, Shrop-

shire, and the west of England. They are very shy and retired, breeding in thick woods, generally of oak : in autumn they migrate into other countries.

4. The passerina, or ground-dove of Carolina, is about the size of a lark. The bill is yellow, and black at the end ; the iris red ; the breast and whole front of a changeable purple, with dark purple spots ; the large quill-feathers are of a muddy purple ; the legs and feet of a dirty yellow ; but the whole bird has such a composition of colours in it, that a very particular description is impossible. They fly many of them together, and make short flights from place to place, generally lighting on the ground.

5. The migratoria, or pigeon of passage, is about the size of an English wood-pigeon ; the bill black ; iris red ; the head of a dusky blue ; the breast and belly of a faint red ; above the shoulder of the wing there is a patch of feathers shining like gold ; the wing is coloured like the head, having some few spots of black (except that the larger feathers of it are dark brown with some white on the exterior vanes ; the tail is very long, and covered with a black feather, under which the rest are white ; the legs and feet are red. They come in prodigious numbers from the north, to winter in Virginia and Carolina. In these countries they roost upon one another's backs in such quantities that they often break down the limbs of oaks which support them, and leave their dung some inches thick below the trees. In Virginia Mr Catesby has seen them fly in such continued trains for three days successively, that they were not lost sight of for the least interval of time, but somewhere in the air they were seen continuing their flight southward. They breed in rocks by the sides of rivers and lakes far north of St Laurence. They fly to the south only in hard winters, and are never known to return.

COLUMBA (St), in allusion to whose name the island of Jona (one of the Hebrides) received its name ; Jona being derived from a Hebrew word signifying a dove. This holy man, persecuted by his zeal, left his native country, Ireland, in the year 565, with the pious design of preaching the gospel to the Picts. It appears that he left his native soil with warm repentment, vowing never to make a settlement within sight of that hated island. He made his first trial at Oran-fay ; and finding that place too near to Ireland, succeeded to his wish at Hy, for that was the name of Jona at the time of his arrival. He repeated here the experiment on several hills, erecting on each a heap of stones ; and that which he last ascended is to this day called *Garnan-chul-reh-Eirinn*, or the eminence of the back turned to Ireland.

Columba was soon distinguished by the sanctity of his manners : a miracle that he wrought, so operated on the Pictish king Bradeus, that he immediately made a present of the little isle to the saint. It seems that his majesty had refused Columba an audience ; and even proceeded so far as to order the palace-gates to be shut against him : but the saint, by the power of his word, instantly caused them to fly open. As soon as he was in possession of Jona, he founded a cell of monks, borrowing his institutions from a certain oriental monastic order. It is said that the first religious were canons regular ; of whom the founder was

Columba.

Pennant's Tour.

Columbanus
↓
Columbo-root.

Columbo-root.

the first abbot: and that his monks, till the year 716, differed from those of the church of Rome, both in the observation of Easter, and in the clerical tonsure. Columba led here an exemplary life, and was highly respected for the sanctity of his manners for a considerable number of years. He is the first on record who had the faculty of *second sight*, for he told the victory of Aidan over the Picts and Saxons on the very instant it happened. He had the honour of burying in his island, Convallius and Kinnatli, two kings of Scotland, and of crowning a third. At length, worn out with age, he died, in Jona, in the arms of his disciples; was interred there, but (as the Irish pretend) in after times translated to Down; where, according to the epitaph, his remains were deposited with those of St Bridget and St Patrick.

Hi tres in *Duno* tumultu tumultantur in uno;
Brigida, Patricius, atque Columba pius.

But this is totally denied by the Scots; who affirm, that the contrary is shewn in a life of the saint, extracted out of the pope's library, and translated out of the Latin into Erse, by Father *Cail o boran*; which decides, in favour of Jona, the momentous dispute.

COLUMBANUS (St.), a Latin poet, was born in Ireland in 560. He retired from the world, and lived a solitary life in the mountains of Wales for some years. He next went over to France and built a monastery; but, being exiled from that country, he travelled to Italy, where he founded the abbey of Bobbio, and died in it in 615.

CULMBINE, in botany. See *AQUILEGIA*.

CULMBO-ROOT, an article newly introduced into the materia medica, of the natural history of which we know very little. Dr Percival is the only person who hath written particularly concerning it, and the substance of his account follows.

The Columbo-root grew originally on the continent of America; from whence it was transplanted to Columbo, a town in Ceylon, which gives name to it, and supplies all India with it. The inhabitants of these countries have for a long time used it in disorders of the stomach and bowels. They carry it about with them, and take it sliced or scraped in Madeira wine. This root comes to us in circular pieces, which are from half an inch or an inch to three inches in diameter; and divided into *frusta*, which measure from two inches to one quarter of an inch. The sides are covered with a thick corrugated bark, of a dark brown hue on its external surface, but internally of a light yellow colour. The surfaces of the transverse sections appear very unequal, highest at the edges, and forming a concavity towards the centre. On separating this surface, the root is observed to consist of three lamina, *viz.* the cortical, which, in the larger roots, is a quarter of an inch thick; the ligneous, about half an inch; and the medullary, which forms the centre, and is near an inch in diameter. This last is much softer than the other parts, and, when chewed, seems mucilaginous; a number of small fibres run longitudinally through it, and appear on the surface. The cortical and ligneous parts are divided by a black circular line. All the thicker pieces have small holes drilled through them, for the convenience of drying. Columbo-root has an aroma-

tic smell; but is disagreeably bitter, and slightly pungent to the taste, somewhat resembling mustard-seed, when it has lost, by long keeping, part of its essential oil. Yet, though ungrateful to the taste, when received into the stomach, it appears to be corroborant, antileptic, sedative, and powerfully antiemetic. In the cholera morbus it alleviates the violent *tormenta*, checks the purging and vomiting, corrects the putrid tendency of the bile, quiets the inordinate motions of the bowels, and speedily recruits the exhausted strength of the patient. It was administered to a great number of patients, sometimes upwards of 20 in a day, afflicted with the cholera morbus, by Mr Johnson of Chester, in 1756. He generally found that it soon stopped the vomiting, which was the most fatal symptom, and that the purging and remaining complaints quickly yielded to the same remedy. The dose he gave was from half a drachm to two drachms of the powder, every three or four hours, more or less, according to the urgency of the symptoms. Though this medicine possesses little or no astringency, it has been observed to be of great service in diarrheas, and even in the dysentery. In the first stage of these disorders, where astringents would be hurtful, Columbo-root may be prescribed with safety; as, by its antispasmodic powers, the irregular actions of the primæ viæ are corrected. But as a cordial, tonic, and antiseptic remedy, it answers better when given towards their decline. Its efficacy has also been observed in the vomitings which attend the bilious cholic; and in such cases, where an emetic is thought necessary, after administering a small dose of ipecacuan, the stomach may be washed with an infusion of Columbo-root. This will tend to prevent those violent and convulsive reachings which in irritable habits abounding with bile are sometimes excited by the mildest emetic. In bilious fevers, 15 or 20 grains of this root, with an equal or double quantity of vitriolated tartar, given every four, five, or six hours, produce very beneficial effects. From its efficacy in these bilious diseases of this country, it is probable that it may be useful in the yellow fever of the West Indies, which is always attended with great sickness, violent reachings, and a copious discharge of bile. The vomiting recurs at short intervals, often becomes almost incessant, and an incredible quantity of bile is sometimes evacuated in a few hours. Children during dentition are often subject to severe vomitings and diarrheas. In these cases the Columbo-root is an useful remedy, and hath often procured almost instant relief, when other efficacious remedies have been tried in vain. This root is also extremely beneficial in a languid state of the stomach, attended with want of appetite, indigestion, nausea and flatulence. It may be given either in substance, with some grateful aromatic, or infused in Madeira wine. Habitual vomiting, when it proceeds from a weakness or irritability of the stomach, from an irregular gout, acidities, acrimonious bile, or an increased and depraved secretion of the pancreatic juice, is greatly relieved by the use of Columbo-root, in conjunction with aromatics, chalybeates, or the testaceous powders. In the nausea and vomiting occasioned by pregnancy, an infusion of Columbo-root succeeds better than any other medicine that hath been tried.

From

Columbo
Columbus.

From Dr Percival's experiments on this root, it appears, that rectified spirit of wine extracts its virtues in the greatest perfection. The watery infusion is more perishable than that of other bitters. In 24 hours a copious precipitation takes place; and in two days it becomes ropy, and even multry. The addition of orange-peel renders the infusion of Columbo-root less ungrateful to the palate. An ounce of the powdered root, half an ounce of orange-peel, two ounces of French brandy, and 14 ounces of water, macerated 12 hours without heat, and then filtered through paper, afford a sufficiently strong and tolerably pleasant infusion. The extract made first by spirit and then with water, and reduced by evaporation to a pilular consistence, is found to be equal if not superior in efficacy to the powder. As an antiseptic, Columbo-root is inferior to the bark; but as a corrector of putrid gall, it is much superior to the bark; whence also it is probable that it would be of service in the West India yellow fever. It also restrains alimentary fermentation, without impairing digestion; in which property it resembles mustard. Hence its great service in preventing acidities. It hath also a remarkable power of neutralizing acids already formed. It doth not appear to have the least heating quality; and therefore may be used with propriety and advantage in the phthisis pulmonalis and in hectic cases, to correct acrimony and strengthen digestion. It occasions no disturbance, and agrees very well with a milk-diet, as it abates flatulence, and is indisposed to acidity.

COLUMBO, a maritime town of the island of Ceylon in the East Indies, seated on the fourth-west part of its coast, and subject to the Dutch. E. Long. 68. 10. N. Lat. 7. 5.

COLUMBUS, or *congregation of St COLUMBUS*, a society of regular canons, who formerly had 100 abbeys or monasteries in the British isles.

COLUMBUS (Christopher), a Genoese, the celebrated navigator, and first discoverer of the islands of America, was a subject of the republic of Genoa. Neither the time nor the place of his birth, however, are known with certainty; only he was descended of an honourable family, who, by various misfortunes, had been reduced to indigence. His parents were sea-faring people; and Columbus having discovered, in his early youth, a capacity and inclination for that way of life, was encouraged by them to follow the same profession. He went to sea at the age of 14: his first voyages were to those ports in the Mediterranean, frequented by the Genoese; after which he took a voyage to Iceland; and proceeding still further north, advanced several degrees within the polar circle. After this, Columbus entered into the service of a famous sea-captain of his own name and family. This man commanded a small squadron, fitted out at his own expence, and by cruising, sometimes against the Mahometans, and sometimes against the Venetians; the rivals of his country in trade, had acquired both wealth and reputation. With him Columbus continued for several years, no less distinguished for his courage than his experience as a sailor. At length, in an oblique engagement, off the coast of Portugal, with some Venetian caravels returning richly laden from the Low Countries, the vessel on board which he

Columbus.

served took fire, together with one of the enemies ships to which it was fast grappled. Columbus threw himself into the sea; laid hold of a floating oar; and by the support of it, and his dexterity in swimming, he reached the shore, though above two leagues distant.

After this disaster, Columbus repaired to Lisbon, where he married a daughter of Bartholomew Perestrelo, one of the captains employed by prince Henry in his early navigations, and who had discovered and planted the islands of Porto Santo and Madeira. Having got possession of the journals and charts of this experienced navigator, Columbus was seized with an irresistible desire of visiting unknown countries. In order to indulge it, he made a voyage to Madaira, and continued during several years to trade with that island, the Canaries, Azores, the settlements in Guinea, and all the other places which the Portuguese had discovered on the continent of Africa.

By the experience acquired in such a number of voyages, Columbus now became one of the most skillful navigators in Europe. At this time, the great object of discovery was a passage by sea to the East Indies. This was attempted, and at last accomplished by the Portuguese, by doubling the Cape of Good Hope. The danger and tediousness of the passage, however, supposing it to be really accomplished, which as yet it was not, set Columbus on considering whether a shorter and more direct passage to these regions might not be found out; and after long consideration, he became thoroughly convinced, that, by sailing across the Atlantic ocean, directly towards the west, new countries, which probably formed a part of the vast continent of India, must infallibly be discovered. His reasons for this were, in the first place, a knowledge he had acquired of the true figure of the earth. The continents of Europe, Asia, and Africa, as far as then known, form but a small part of the globe. It was suitable to our ideas, concerning the wisdom and beneficence of the Author of nature, to believe, that the vast space, still unexplored, was not entirely covered by a waste and barren ocean, but occupied by countries fit for the habitation of man. It appeared likewise extremely probable, that the continent on this side the globe was balanced by a proportional quantity of land in the other hemisphere. These conjectures were confirmed by the observations of modern navigators. A Portuguese pilot, having stretched farther to the west than was usual at that time, took up a piece of timber, artificially carved, floating upon the sea; and as it was driven towards him by a westerly wind, he concluded that it came from some unknown land situated in that quarter. Columbus's brother-in-law had found to the west of the Madeira isles, a piece of timber fashioned in the same manner, and brought by the same wind; and had seen also canes of an enormous size floating upon the waves, which resembled those described by Ptolemy, as productions peculiar to the East Indies. After a course of westerly winds, trees, torn up by the roots, were often driven upon the coasts of the Azores; and at one time the dead bodies of two men, with singular features, which resembled neither the inhabitants of Europe nor Africa, were cast ashore there. The most cogent reason, however, was a mistaken notion of the

the.

Columbus. the ancient geographers, concerning the immense extent of the continent of India. Though hardly any of them had penetrated beyond the river Ganges, some Greek writers had ventured to describe the provinces beyond that river, which they represented as regions of an immense extent. Ctesias affirmed that India was as large as all the rest of Asia. Onesicritus, whom Pliny the naturalist follows, contended that it was equal to a third part of the habitable earth. Nearchus asserted that it would take four months to march from one extremity of it to the other in a straight line. The journal of Marco Polo, who travelled into Asia in the 13th century, and who had proceeded towards the east far beyond the limits to which any European had ever advanced, seemed also so much to confirm these accounts, that Columbus was persuaded, that the distance from the most westerly part of Europe, to the most easterly part of Asia, was not very considerable; and that the shortest as well as most direct course to the remote regions of the east, was to be found by sailing due west.

In 1474, Columbus communicated his ideas on this subject to one Paul a physician in Florence, a man eminent for his knowledge in cosmography. He approved of the plan, suggested several facts in confirmation of it, and warmly encouraged Columbus to persevere in an undertaking so laudable, and which must redound so much to the honour of his country, and the benefit of Europe. Columbus, fully satisfied of the truth of his system, was impatient to set out on a voyage of discovery. The first step towards this was to secure the patronage of some of the considerable powers of Europe capable of undertaking such an enterprise. He applied first to the republic of Genoa; but his countrymen, strangers to his abilities, inconsistently rejected his proposal as the dream of a chimerical projector, and thus lost forever the opportunity of restoring their commonwealth to its ancient lustre. His next application was to the court of Portugal, where king John II. listened to him in the most gracious manner, and referred the consideration of his plan to Diego Ortiz, bishop of Ceuta, and two Jewish physicians, eminent cosmographers, whom he was accustomed to consult in matters of this kind. Unhappily these were the persons who had been the chief directors of the Portuguese navigations, and had advised to search for a passage to India by steering a course directly opposite to that which Columbus had recommended as shorter and more certain. They could not therefore approve of his proposal, without submitting to the double mortification of condemning their own theory, and of acknowledging his superiority. The result of their conferences was, that they advised the king to fit out a vessel privately, in order to attempt the proposed discovery, by following exactly the course which Columbus seemed to point out. John, forgetting on this occasion the sentiments of a monarch, meekly adopted this perfidious counsel. But the pilot, chosen to execute Columbus's plan, had neither the genius nor fortune of its author. Contrary winds arose; no sign of approaching land appeared; his courage failed; and he returned to Lisbon, execrating the project as equally extravagant and dangerous.

On discovering this dishonourable transaction, Co-

lumbus immediately quitted Portugal, and applied to the king of Spain; but lest he should be here again appointed, he sent his brother Bartholomew into England, to whom he had fully communicated his ideas, in order that he might negotiate at the same time with Henry VII. who was reckoned one of the most sagacious as well as opulent princes of Europe. Bartholomew was very unfortunate in his voyage: he fell into the hands of pirates, who stripped him of every thing, and detained him a prisoner for several years. At last he made his escape, and arrived in London, but in such extreme indigence, that he was obliged to employ himself, during a considerable time, in drawing and selling maps, in order to pick up as much money as would purchase a decent dress in which he might venture to appear at Court. The proposals were received by Henry with more approbation than by any monarch to whom they had hitherto been presented.

Columbus himself made his proposals to the king of Spain, not without many doubts of success, which soon appeared to be well founded. True science had as yet made so little progress in the kingdom of Spain, that most of those to whom the consideration of his plan was referred were utterly ignorant of the first principles on which he founded his hopes. Some, from mistaken notions concerning the dimensions of the globe, contended that a voyage to those remote regions of the East which Columbus expected to discover, could not be performed in less than three years. Others concluded, that either he would find the ocean of infinite extent, according to the opinion of some ancient philosophers; or that if he should persist in steering westwards beyond a certain point, the convex figure of the globe must infallibly prevent his return, and he must perish in the vain attempt to unite the two opposite hemispheres, which nature had for ever dijoined. Even without deigning to enter into any particular discussion, some rejected the scheme in general, upon the credit of a maxim made use of by the ignorant in all ages, "That it is presumptuous in any person to suppose that he alone possesses knowledge superior to all the rest of mankind united." By continual disappointments and delays, he was at last wearied out, and resolved to repair to the court of England in person, in hopes of meeting with a favourable reception there. He had already made preparations for this purpose, and taken measures for the disposal of his children during his absence, when Juan Perez, the prior of the monastery of Rabida near Palos, in which they had been educated, earnestly solicited him to defer his journey for a short time. Perez was a man of considerable learning, and some credit with queen Isabella. To her therefore he applied; and the consequence of his application was a gracious invitation of Columbus back to court, accompanied with the present of a small sum to equip him for the journey. Ferdinand, however, still regarded the project as chimerical; and had the address to employ, in this new negotiation with him, some of the persons who had formerly pronounced his scheme to be impracticable. To their astonishment, Columbus appeared before them with the same confident hopes of success as formerly, and insisted

Columbus. insisted on the same high recompence. He proposed that a small fleet should be fitted out, under his command, to attempt the discovery; and demanded to be appointed perpetual and hereditary admiral and viceroy of all the seas and lands which he should discover; and to have the tenth of the profits arising from them settled irrevocably upon him and his descendants forever. At the same time he offered to advance the eighth part of the sum necessary for accomplishing his design, on condition that he should be entitled to a proportional share in the adventure. If the enterprize should totally miscarry, he made no stipulation for any reward or emolument whatever. These demands were thought unreasonable; Isabella broke off the treaty she had begun, and Columbus was once more disappointed. He now resolved finally to leave Spain; and had actually proceeded some leagues on his journey, when he was overtaken by a messenger from Isabella, who had been prevailed upon by the arguments of Quintanilla and Santangel, two of Columbus's patrons, again to favour his undertakings. The negotiation now went forward with all manner of facility and dispatch; and a treaty with Columbus was signed on the 17th of April 1492. The chief articles of it were, that Columbus should be constituted high admiral in all the seas, islands and continents he should discover, with the same powers and prerogatives that belonged to the high admiral of Castile within the limits of his jurisdiction. He was also appointed viceroy in all those countries to be discovered; and a tenth of the profits accruing from their productions and commerce was granted to him forever. All controversies or law-suits with respect to mercantile transactions were to be determined by the sole authority of Columbus, or of judges to be appointed by him. He was also permitted to advance one-eighth part of the expence of the expedition, and of carrying on commerce with the new countries; and was entitled, in return, to an eighth part of the profit. But, though the name of Ferdinand was joined with Isabella in this transaction, his distrust of Columbus was still so violent that he refused to take any part in the enterprize as king of Arragon; and as the whole expence of the expedition was to be defrayed by the crown of Castile, Isabella reserved for her subjects of that kingdom an exclusive right to all the benefits which might accrue from its success.

At last our adventurer set sail with three small ships, the whole expence of which did not exceed L. 4000. During his voyage he met with many difficulties from the mutinous and timid disposition of his men. He was the first who observed the variation of the compass, which threw the sailors into the utmost terror. For this phenomenon, Columbus was obliged to invent a reason, which though it did not satisfy himself, yet served to dispel their fears, or silence their murmurs. At last, however, the sailors lost all patience; and the admiral was obliged to promise solemnly, that in case land was not discovered in three days he should return to Europe. That very night, however, the island of San Salvador was discovered, which quickly put an end to all their fears. The sailors were then as extravagant in the praise of Columbus, as they had before been insolent in reviling and threatening him.

They threw themselves at his feet, implored his pardon, and pronounced him to be a person inspired by heaven with more than human sagacity and fortune, in order to accomplish a design so far beyond the ideas and conception of all former ages. Having visited several of the West-India islands, and settled a colony in Hispaniola*, he again set sail for Spain; and after eluding great dangers from violent tempests, arrived at the port of Palos on the 15th of March 1493.

As soon as Columbus's ship was discovered approaching, all the inhabitants of Palos ran eagerly to the shore, where they received the admiral with royal honours. The court was then at Barcelona, and Columbus took care immediately to acquaint the king and queen of his arrival. They were no less delighted than astonished with this unexpected event. They gave orders for conducting him into the city with all imaginable pomp. They received him clad in their royal robes, and seated on a throne under a magnificent canopy. When he approached, they stood up, and, raising him as he kneeled to kiss their hands, commanded him to take his seat upon a chair prepared for him, and to give a circumstantial account of his voyage. When he had finished his oration, which he delivered with much modesty and simplicity, the king and queen, kneeling down, offered up solemn thanks to God for the discovery. Every possible mark of honour that could be suggested by gratitude or admiration was conferred on Columbus; the former capitulation was confirmed, his family was ennobled, and a fleet was ordered to be equipped, to enable him to go in quest of those more opulent countries which he still confidently expected to find.

Notwithstanding all this respect, however, Columbus was no longer regarded than he was successful. The colonists he carried over with him were to the last degree unreasonable and unmanageable; so that he was obliged to use some severities with them; and complaints were made to the court of Spain against him for cruelty. On this, Francis de Bovadilla, a knight of Calatrava, was appointed to inquire into the conduct of Columbus; with orders, in case he found the charge of maladministration proved, to supersede him, and assume the office of governor of Hispaniola. The consequence of this was, that Columbus was sent to Spain in chains. From there, however, he was freed immediately on his arrival, and had an opportunity granted him of vindicating his innocence. He was however deprived of all power; and notwithstanding his great services, and the solemnity of the agreement between him and Ferdinand, Columbus never could obtain the fulfilment of any part of that treaty. At last, disgusted with the ingratitude of a monarch whom he had served with such fidelity and success, and exhausted with fatigues, he ended his life on the 29th of May 1506.

COLUMBUS (Bartholomew), brother to Christopher, famous for his marine charts and spheres, which he presented to Henry VII. of England. He died in 1514.

COLUMBUS (Don Ferdinand), son of Christopher, and writer of his life. He entered into the ecclesiastical state; and founded a library, which he bequeathed to the church of Seville, to this day called the *Columbine library*. He died in 1560.

Columb
Columella.

* See H/
paniola.

Columella
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Colum.

COLUMELLA (Lucius Junius Moderatus), a Roman philosopher, was a native of Cadiz, and lived under the emperor Claudius, about the year 42. He wrote a book on agriculture, intitled *De Re rustica*, and another *De Arboribus*.

COLUMEY, a town of Red Ruffia in Poland, seated on the river Pruth, towards the confines of Moldavia, about 38 miles from Halez, and 63 south of Leopold. This town has been very ill treated by the Cossacks, inasmuch that it is now inconsiderable, though there are several mines of salt in its district. E. Long. 16. 25. N. Lat. 48. 45.

COLUMN, in architecture, a round pillar made to support and adorn a building, and composed of a base, a shaft, and a capital. See ARCHITECTURE, n^o 38.

COLUMNS, denominated from their use.—Astronomical **COLUMN**, is a kind of observatory, in form of a very high tower built hollow, and with a spiral ascent to an armillary sphere placed a-top for observing the motions of the heavenly bodies. Such is that of the Doric order erected at the Hotel de Soissons at Paris by Catharine de Medicis for the observations of Orontius Fincus, a celebrated astronomer of that time.

Chronological COLUMN, that which bears some historical inscription digested according to the order of time; as by lustres, olympiads, fasti, epochas, annals, &c. At Athens, there were columns of this kind, whereon were inscribed the whole history of Greece digested into olympiads.

Funerary COLUMN, that which bears an urn, whereon are supposed to be inclosed the ashes of some deceased hero; and whose shaft is sometimes overpiped with tears and flames, which are symbols of grief and of immortality.

Gnomonic COLUMN, a cylinder whereon the hour of the day is represented by the shadow of a stile. See DIAL.

Historical COLUMN, is that whose shaft is adorned with a basso-relievo, running in a spiral line its whole length, and containing the history of some great personage: such are the *Trajan* and *Antonine* columns at Rome.

Hollow COLUMN, that which has a spiral stair-case within, for the convenience of ascending to the top; as the *Trajan* column, the stair-case whereof consists of 185 steps, and is illuminated by 43 little windows, each of which is divided by tambours of white marble. The monument, or fire-column, at London, has also a stair-case; but it does not reach to the top. These kinds of columns are also called *columna coelices*, or *coeliceæ*.

Indicative COLUMN, that which serves to show the tides, &c. along the sea-coasts. Of this kind there is one at Grand Cairo of marble, whereon the overflowings of the Nile are expressed: by this they form a judgment of the succeeding season; when the water, for instance, ascends to 23 feet, it is a sign of great fertility in Egypt. See NILOMETER.

Instructive COLUMN, that raised, according to Josephus, lib. i. cap. 3. by the sons of Adam, whereon were engraven the principles of arts and sciences. Baudelot tells us, that the son of Pisisstratus raised another of this kind, of stone, containing the rules and precepts of agriculture.

Itinerary COLUMN, a column with several faces, placed in the cross-ways in large roads; serving to show the different routs by inscriptions thereon.

Lactary COLUMN, at Rome, according to Festus, was a column erected in the herb-market, now the place *Montanara*, which had a cavity in its pedestal, wherein young children abandoned by their parents, out of poverty or inhumanity, were exposed, to be brought up at the public expence.

Legal COLUMN. Among the Lacedemonians there were columns raised in public places, whereon were engraven the fundamental laws of the state.

Limitrophic or Boundary COLUMN, that which shows the limits of a kingdom or country conquered. Such was that which Pliny says Alexander the Great erected at the extremity of the Indies.

Manubary COLUMN, from the Latin *manubie*, "spoils of the enemy;" a column adorned with trophies built in imitation of trees, whereon the spoils of enemies were anciently hung. See TROPHY.

Memorial COLUMN, that raised on occasion of any remarkable event; as the monument of London, built to perpetuate the memory of the burning of that city in 1666. It is of the Doric order, fluted, hollow, with a winding stair-case; and terminated a-top with waving flames. There is also another of the kind, in form of an obelisk, on the banks of the Rhine in the Palatinate, in memory of the famous passage of that river by the great Gustavus Adolphus and his army.

Menian COLUMN, any column which supports a balcony or meniana. The origin of this kind of column, Suetonius and Alcanius refer to one Menias; who having sold his house to Cato and Flaccus, consuls, to be converted into a public edifice, reserved to himself the right of raising a column without side, to bear a balcony, whence he might see the shews.

Miliary COLUMN, was a column of marble raised by order of Augustus in the middle of the Roman forum; from whence, as a centre, the distances of the several cities, &c. of the empire were reckoned, by other miliary columns disposed at equal distances on all the grand roads. This column was of white marble, the same with that which is now seen on the balustrade of the perron of the capitol at Rome. Its proportion is massive, being a short cylinder, the symbol of the globe of the earth. It was called *miliareum aureum*, as having been gilt, at least the ball, by order of Augustus. It was restored by the emperors Vespasian and Adrian, as appears by the inscriptions.

Military COLUMN, among the Romans, a column whereon was engraven a list of the forces in the Roman army, ranged by legions, in their proper order; with design to preserve the memory of the number of soldiers, and of the order preserved in any military expedition. They had another kind of military column, which they called *columna bellica*, standing before the temple of Janus; at the foot whereof the consul declared war, by throwing a javelin towards the enemies countries.

Sepulchral COLUMN, anciently was a column erected on a tomb or sepulchre, with an inscription on its base. Those over the tombs of persons of distinction were very large; those for the common people small: these last are called *stelæ* and *cippi*.

Statuary

Statuary COLUMN, that which supports a statue. Such was that erected by pope Paul V. on a pedestal before the church of St Maria at Rome; to support a statue of the Virgin, which is of gilt brass. This column was dug up in the temple of peace; its shaft is a single block of white marble 49 feet high, and five feet eight inches diameter, of the Corinthian order.

The term *statuary column* may likewise be applied to caryatides, peristans, termini, and other human figures, which do the office of columns; and which Vitruvius calls *telamones*, and *atlantes*. See ARCHITECTURE, n° 59.

Triumphal COLUMN, a column erected among the ancients in honour of an hero; the joints of the stones, or courses whereof, were covered with as many crowns as he had made different military expeditions. Each crown had its particular name, as *vallis*, which was beset with spikes, in memory of having forced a palisade. *Muralis*, adorned with little turrets or battlements, for having mounted an assault. *Navalis*, of prows and beaks of vessels; for having overcome at sea. *Obsidionalis*, or *graninalis*, of grails; for having raised a siege. *Qvanti*, of myrtle; which expressed an ovation, or little triumph: and *triumphalis*, of laurel, for a grand triumph. See CROWN.

COLUMNÆA, in botany, a genus of the angiospermia order, belonging to the didynamia class of plants. There is but one species, a native of Martinnico, of which we have no particular description.

COLUMNIFERI, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnæus, in which are the following genera, *viz.* bixa, corchorus, heliocarpus, kiggelaria, microcos, muntingia, thea, tilea, turnera, triumfetta, ayenia, grevia, helicteres, kleinhovia, adanfonia, alcea, althea, bombax, camellia, golyptium, hermannia, hibiscus, lavatera, malope, malva, melochia, napæa, pentapetes, sida, stewartia, theobroma, urena, waltharia.

COLURES, in astronomy and geography, two great circles supposed to intersect each other at right angles in the poles of the world, and to pass through the solstitial and equinoctial points of the ecliptic. See GEOGRAPHY.

COLURI, a little island in the gulph of Engia, in the Archipelago, formerly called *Salamis*. The principal town is of the same name, and seated on the south side, at the bottom of the harbour, which is one of the finest in the world. The famous Grecian hero, Ajax, who makes such a figure in Homer's Iliad, was king of this island. It is now, however, but a poor place; its commodities consist of wheat, barley, tar, rosin, pit-coal, sponges, and pot-alies, which they carry to Athens. It is seven miles south from Athens, and is separated from the continent by a strait about a mile over.

COLUTEA, **RASTARD-SENA**, in botany; a genus of the decandria order, belonging to the diadelphia class of plants. There are three species, all of them deciduous flowering shrubs, adorned with many lobed leaves, and butterfly-shaped flowers, of a deep yellow or red colour. They are propagated both by seeds and layers, and are hardly enough, though they sometimes require a little shelter, when the weather is very cold.

COLYMBUS, in ornithology, a genus belonging to the order of anseres. The bill has no teeth, is subu-

lated, straight, and sharp-pointed; the teeth are in the throat; the nostrils are linear, and at the base of the bill; and the legs are unfit for walking. This genus includes the grebes and divers. The species are eleven.

1. The grylle is in length 14 inches, in breadth 22; the bill is an inch and an half long, straight, slender, and black; the inside of the mouth red; on each wing is a large bed of white, which in young birds is spotted; the tips of the lesser quill-feathers, and the coverts of the wings, are white: except those, the whole plumage is black. In winter it is said to change to white; and a variety spotted with black and white is not uncommon in Scotland. The tail consists of 12 feathers; the legs are red. These birds are found on the Bass Isle in Scotland; in the island of St Kilda; and, as Mr Ray imagines, in the Fam Islands off the coast of Northumberland. It has also been seen on the rocks of Llandidno, in Caernarvonshire, in Wales. Except in breeding-time it keeps always at sea; and is very difficult to be shot, diving at the flash of the pan. The Welsh call this bird *cafgan longur*, or "the sailor's hatred," from a notion that its appearance forebodes a storm. It visits St Kilda's in March; makes its nest far under ground; and lays a grey egg, or, as Steller says, whitish and spotted with rust, and speckled with ash-colour.

2. The trille weighs 24 ounces; its length is 17 inches, the breadth 27½; the bill is three inches long, black, straight, and sharp-pointed; near the end of the lower mandible is a small process; the inside of the mouth yellow; the feathers on the upper part of the bill are short and soft like velvet; from the eye to the hind part of the head is a small division of the feathers. The head, neck, back, wings, and tail, are of a deep mouse-colour; the tips of the lesser quill-feathers white; the whole under part of the body is of a pure white; the sides under the wings marked with dusky lines. Immediately above the thighs are some long feathers that curl over them. The legs are dusky. They are found in amazing numbers on the high cliffs of several of the British coasts, and appear at the same time with the auk. They are very simple birds; for notwithstanding they are shot at, and see their companions killed by them, they will not quit the rock. Like the auk they lay only one egg, which is very large; some are of a fine pale blue; others white, spotted, or most elegantly streaked with lines crossing each other in all directions. They continue about the Orkneys the whole winter.

3. The septentrionalis is more elegantly shaped than the others. It weighs three pounds. The length to the end of the tail is two feet; to the toes, two feet four inches: the breadth, three feet five inches. The head is small and taper; the bill straight; the head and chin are of a fine uniform grey; the hind part of the neck marked with dusky and white lines pointing downwards; the throat is of a dull red; the whole upper part of the body, tail, and wings, of a deep grey, almost dusky; but the coverts of the wings and the back are marked with a few white spots; the under side of the body is white; the legs dusky. This species breeds in the northern parts of Europe, on the borders of lakes; but migrates southward during winter. They build their nests upon the shore without

4. The arcticus is somewhat larger than the last: the bill is black, and also the front; the hind part of the head and neck cinereous; the sides of the neck marked with black and white lines pointing downwards; the fore part of a glossy variable black, purple, and green. The back, scapulars, and coverts of the wings, are black, marked, the two first with square, the last with round spots of white; the quill-feathers dusky; the breast and belly white; the tail short and black; legs partly dusky, and partly reddish.

5. The glacialis is three feet five inches in length; the breadth four feet eight; the bill to the corners of the mouth four inches long, black and strongly made. The head and neck are of a deep black; the hind part of the latter is marked with a large feminar white band; immediately under the throat is another; both marked with black oblong strokes pointing down: the lower part of the neck is of a deep black, glossed with a rich purple; the whole under side of the body is white; the sides of the breast marked with black lines; the back, coverts of the wings, and scapulars, are black marked with white spots; those on the scapulars are very large, and of a square shape; two at the end of each feather. The tail is very short, and almost concealed by the coverts, which are dusky, spotted with white; the legs are black. These birds inhabit the northern parts of Britain, live chiefly at sea, and feed on fish; but it is not known whether they breed here as they do in Norway, which has many birds in common with Scotland. In the Highlands it is called *myr-buachail*, or "the herdsman of the sea," from its being so much in that element.

6. The immer, or ember-geofe, is superior in size to a common geofe. The head is dusky; the back, coverts of the wings, and tail, clouded with lighter and darker shades of the same. The primaries and tail are black; the under side of the neck spotted with dusky; the breast and belly silvery; the legs black. They inhabit the seas about the Orkney Islands; but in severe winters visit the southern parts of Great Britain. They live so much at sea, that it has been imagined they never quitted the water; and that the young were hatched in a hole formed by nature under the wing for that end. Their skins are uncommonly tough, and in the northern countries have been used as leather.

7. The crystalus, or cargoofe, weighs two pounds and an half. Its length is 21 inches, the breadth 30; the bill is two inches and a quarter long, red at the base, and black at the point; between the bill and the eyes is a stripe of black naked skin; the irides are of a fine pale red; the tongue is a third part shorter than the bill, slender, hard at the end, and a little divided; on the head is a large dusky crest, separated in the middle. The cheeks and throat are surrounded with a long pendent ruff, of a bright tawney colour, edged with black; the chin is white; from the bill to the eye is a black line, and above that a white one; the hind part of the neck and the back are of a footy hue; the rump, for it wants a tail, is covered with long soft down. The covert-feathers on the second and third joints of the wing, and the under coverts are white;

all the other wing-feathers, except the secondaries, are dusky, those being white; the breast and belly are of a most beautiful silvery white, glossy as satin: the outside of the legs, and the bottom of the feet, are dusky; the inside of the legs, and the toes, of a pale green. These birds frequent the meres of Shropshire and Cheshire, where they breed; and the great fen of Lincolnshire, where they are called *gaunts*. Their skins are made into tippets, and sold at as high a price as those which come from Geneva. This species lays four eggs of a white colour, and the same size with those of a pigeon. The nest is formed of the roots of hughane, stalks of water-lily, pond-weed, and water-violet, floating independent among the reeds and flags; the water penetrates it, and the bird sits and hatches the eggs in that wet condition; the nest is sometimes blown from among the flags into the middle of the water; in these circumstances the fable of the halcyon's nest may, in some measure, be vindicated. It is a careful nurse of its young; being observed to feed them most assiduously, commonly with small eels; and when the infant-brood are tired, the parent will carry them either on its back, or under its wings. It preys on fish, and is almost perpetually diving; it does not show much more than the head above water; and is very difficult to be shot, as it darts down on the least appearance of danger. It is never seen on land; and, though disturbed ever so often, will not fly farther than the end of the lake. Its skin is out of season about February, losing then its bright colour; and in the breeding time its breast is almost bare. The flesh is excessively rank.

8. The auritus, or eared dob-chick, is in length one foot to the rump; the extent is 22 inches: the bill black, slender, and slightly recurved; the irides crimson; the head and neck are black; the throat spotted with white; the whole upper side of a blackish brown, except the ridge of the wing about the first joint, and the secondary feathers, which are white; the breast, belly, and inner coverts of the wings are white; the subaxillary feathers, and some on the side of the rump ferruginous. Behind the eyes, on each side, is a tuft of long, loose, rust coloured feathers hanging backwards; the legs are of a dusky green. They inhabit the fens near *Spalding*, where they breed. No external difference is to be observed between the male and the female of this species. They make their nest not unlike that of the former; and lay four or five small eggs.

9. The urinator differs from the crystalus only in being rather less, and wanting the crest and ruff. The sides of the neck are striped downwards from the head with narrow lines of black and white: in other respects the colours and marks agree with that bird. This species has been shot on Rostern Mere in Cheshire. It is rather scarce in England, but is common in the winter time on the lake of Geneva. They appear there in flocks of 10 or twelve; and are killed for the sake of their beautiful skins. The under side of them being dressed with the feathers on, are made into muffs and tippets: each bird sells for about 14 shillings.

10. The dominicus, with lobated feet, a smooth head, and the belly very much spotted.

11. The padiceps, or pied-bill dob-chick, weighs half

half a pound; the eyes are large and encompassed with a white circle; the throat has a black spot; a black list crosses the middle of the bill; the lower mandible next the basis has a black spot. The head and neck are brown; the crown of the head and back part of the neck are darkest; the feathers of the breast are light brown mixed with green; the belly is dusky white; the back and wings brown; they frequent many of the fresh water ponds in the inhabited parts of Carolina.

COM, a town of Asia in the empire of Persia, and province of Iracagemi. It is a large populous place, but has suffered greatly by the civil wars. E. Long. 49. I. N. Lat. 34. O.

COMA, or COMA-VIGIL, a preternatural propensity to sleep, when, nevertheless, the patient does not sleep, or if he does, awakes immediately without any relief. See (the *Index* subjoined to) MEDICINE.

COMA *Berenices*, Berenice's hair, in astronomy, a constellation in the northern hemisphere, composed of stars near the lion's tail. This constellation consists of three stars, according to Ptolemy; of 13, according to Tycho; and of 40, in the Britannic Catalogue.

COMA *Somnolentum*, is when the patient continues in a profound sleep, and, when awaked, immediately relapses, without being able to keep open his eyes.

COMARUM, MARSH-CINQUEFOIL; a genus of the polygynia order, belonging to the icofandria class of plants. There is but one species, a native of Britain. It rises about two feet high, and bears fruit somewhat like that of the strawberry. It grows naturally in bogs, so is not easily preserved in gardens. The root dyes a dirty red. The Irish rub their milking pails with it, and it makes the milk appear thicker and richer. Goats eat the herb; cows and sheep are not fond of it; horses and swine refuse it.

COMB, an instrument to clean, untangle, and dress, flax, wool, hair, &c.

Combs for wool are prohibited to be imported into England.

COMB is also the crest, or red fleshy tuft, growing upon a cock's head.

COMBAT, in a general sense, denotes an engagement, or a difference decided by arms. See BATTLE.

COMBAT, in our ancient law, was a formal trial of some doubtful cause or quarrel, by the swords or bastons of two champions. This form of proceeding was very frequent, not only in criminal but in civil causes; being built on a supposition that God would never grant the victory but to him who had the best right. The last trial of this kind in England, was between Donald lord Ray appellant, and David Ramsay Esq; defendant; when after many formalities, the matter was referred to the King's pleasure. See the article BATTLE.

COMBINATION, properly denotes an assemblage of several things two by two.

COMBINATION, in mathematics, is the variation or alteration of any number of quantities, letters, or the like, in all the different manners possible. See CHANGES.

Aphorism. I. In all combinations, if from an arithmetic decreasing series, whose first term is the number out of which the combinations are to be formed, and

whose common difference is 1, there be taken as many terms as there are quantities to be combined; and these terms be multiplied into each other: and if from the series 1, 2, 3, 4, &c. there may be taken the same number of terms, and they be multiplied into each other, and the first product be divided by the second; the quotient will be the number of combinations required. Therefore, if you would know how many ways four quantities can be combined in seven, multiply the first four terms of the series, 7, 6, 5, 4, &c. together, and divide the product, which will be 840, by the product of the first four terms of the series, 1, 2, 3, 4, &c. which is 24, and the quotient 35 will be the combinations of 4 in 7. II. In all permutations, if the series 1, 2, 3, 4, &c. be continued to as many terms as there are quantities to be changed, and those terms be multiplied into each other; the product will be the number of permutations sought. Thus, if you would know how many permutations can be formed with five quantities, multiply the terms 1, 2, 3, 4, 5 together, and the product 120 will be the number of all the permutations.

Problems. I. To find the number of changes that may be rung on 12 bells. It appears by the second aphorism, that nothing is more necessary here than to multiply the numbers from 1 to 12 continually into each other, in the following manner, and the last product will be the number sought.

1
2
2
3
6
4
24
5
120
6
720
7
5040
8
40320
9
362880
10
3628800
11
39916800
12
479,001,600

II. Suppose the letters of the alphabet to be wrote so final that no one of them shall take up more space than the hundredth part of a square inch: to find how many square yards it would require to write all the permutations of the 24 letters in that size. By following the same method as in the last problem, the number of permutations of the 24 letters will be found to be 62,044,840,173,323,943,936,000. Now the inches in a square yard being 1296, that number multiplied by 100 gives 129600, which is the number of letters

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letters each square yard will contain; therefore if we divide 62,044,840,173,323,943,936,000 by 129600 the quotient, which is 478,741,050,720,092,160, will be the number of yards required, to contain the above-mentioned number of permutations. But as all the 24 letters are contained in every permutation, it will require a space 24 times as large; that is, 11,489,785,217,282,211,840. Now the number of square yards contained on the surface of the whole earth is but 617,197,435,008,000, therefore it would require a surface 18620 times as large as that of the earth to write all the permutations of the 24 letters in the size above-mentioned.

III. To find how many different ways the eldest hand at piquet may take in his five cards. The eldest hand having 12 cards dealt him, there remain 20 cards, any five of which may be in those he takes in; consequently we are here to find how many ways five cards may be taken out of 20. Therefore, by aphorism I. if we multiply 20, 19, 18, 17, 16, into each other, which will make 1860480, and that number be divided by 1, 2, 3, 4, 5, multiplied into each other, which make 120, the quotient, which is 15504, will be the number of ways five cards may be taken out of 20. From hence it follows, that it is 15503 to 1, that the eldest hand does not take in any five certain cards.

IV. To find the number of deals a person may play at the game of whist, without ever holding the same cards twice. The number of cards played with at whist being 52, and the number dealt to each person being 13, it follows, that by taking the same method as in the last experiment, that is, by multiplying 52 by 51, 50, &c. so on to 41, which will make 3,954,242,643,911,239,680,000, and then dividing that sum by 1, 2, 3, &c. to 13, which will make 6,227,020,800, the quotient, which is 635,013,559,600 will be the number of different ways 13 cards may be taken out of 52, and consequently the number sought.

THE ARITHMETIC TRIANGLE; OR TABLE FOR COMBINATIONS.

Rank	A	B
1	1	1
2	2	1
3	3	3
4	4	6
5	5	10
6	6	15
7	7	21
8	8	28
9	9	36
10	10	45
11	11	55
12	12	66

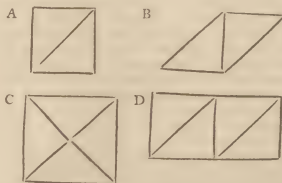
The construction of this table is very simple. The line A *a* consists of the first 12 numbers. The line A *b* consists every where of units; and second term 3, of the line B *c*, is composed of the two terms 1 and 2 in the preceding rank: the third term 6, in that line, is formed of the two terms 3 and 3 in the preceding rank: and so of the rest; every term, after the first, being composed of the two next terms in the preceding rank: and by the same method it may be continued to any number of ranks. To find by this table how often any number of things can be combined in another number, under 13, as suppose 5 cards out of 8; in the eighth rank look for the fifth term, which is 56, and that is the number required.

Though we have shewn in the foregoing problems the manner of finding the combination of all numbers whatever, yet as this table answers the same purpose, for small numbers, by inspection only, it will be found useful on many occasions; as will appear by the following examples.

- V. To find how many different sounds may be produced by striking on a harpsichord two or more of the seven natural notes at the same time. 1. The combinations of two in seven, by the foregoing triangle are
2. The combinations of 3 in 7, are
3. The combinations of 4 in 7, are
4. The combinations of 5, are
5. The combinations of 6, are
6. The seven notes all together once

Therefore the number of all the sounds will be

VI. Take four square pieces of pasteboard, of the same dimension, and divide them diagonally, that is by drawing a line from two opposite angles, as in the figures, into 8 triangles; paint 7 of these triangles with the primitive colours, red, orange, yellow, green, blue, indigo, violet, and let the eighth be white. To find how many chequers or regular four-sided figures, different either in form or colour, may be made out of those eight triangles. First, by combining two of these triangles, there may be formed either the triangular square A, or the inclined square B called a *rhomb*. Secondly, by combining four of the triangles, the large square C, may be formed; or the long square D, called a *parallelogram*.



Now the first two squares, consisting of two parts out of 8, they may each of them, by the eighth rank of the triangle, be taken 28 different ways, which makes

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makes 56. And the last two squares, consisting of four parts, may each be taken by the same rank of the triangle 70 times, which makes 140
To which add the foregoing number 56

And the number of the different squares that may be formed of the 8 triangles, will be 196

VII. A man has 12 different sorts of flowers, and a large number of each sort. He is desirous of setting them in beds or flourishes, in his parterre. Six flowers in some, 7 in others, and 8 in others; so as to have the greatest variety possible; the flowers in no two beds to be the same. To find how many beds he must have. 1. The combinations of 6 in 12 by the last rank of the triangle, are 924

2. The combinations of 7 in 12, are 792

3. The combinations of 8 in 12, are 495

Therefore the number of beds must be 2211

VIII. To find the number of chances that may be thrown on two dice. As each die has 6 faces, and as every face of one die may be combined with all the faces of the other, it follows, that 6 multiplied by 6, that is 36, will be the number of all the chances; as is also evident from the following table :

Points.	Numb. of chances.	Numb. of points.
2 1.1	1	2
3 2.1 1.2	2	6
4 2.2 3.1 1.3	3	12
5 4.1 1.4 3.2 2.3	4	20
6 3.3 5.1 1.5 4.2 2.4	5	30
7 6.1 1.6 5.2 2.5 4.3 3.4	6	42
8 4.4 6.2 2.6 5.3 3.5	5	40
9 6.3 3.6 5.4 4.5	4	36
10 5.5 6.4 4.6	3	30
11 6.5 5.6	2	22
12 6.6	1	12
	26	252

It appears by this table, 1. That the number of chances for each point continually increases to the point of seven, and then continually decreases till 12: therefore if two points are proposed to be thrown, the equality, or the advantage of one over the other, is clearly visible *. 2. The whole number of chances on the dice being 252, if that number be divided by 36, the number of different throws on the dice, the quotient is 7: it follows therefore, that at every throw there is an equal chance of bringing seven points. 3. As there are 36 chances on the dice, and only 6 of them doublets, it is 5 to 1, at any one throw, against throwing a doublet.

By the same method the number of chances upon any number of dice may be found: for if 36 be multiplied by 6, that product, which is 216, will be the chances on 3 dice; and if that number be multiplied by 6, the product will be the chances on 4 dice, &c.

COMBINATIONS of the Cards. The following experiments, founded on the doctrine of combinations, may possibly amuse a number of our readers. The tables given are the basis of many experiments, as well on numbers, letters, and other subjects, as on the cards; but the effect produced by them with the

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last is the most surprising, as that which should seem to prevent any collusion, that is, the shuffling of the cards, is on the contrary the cause from whence it proceeds.

It is a matter of indifference what numbers are made use of in forming these tables. We shall here confine ourselves to such as are applicable to the subsequent experiments. Any one may construct them in such manner as is agreeable to the purposes he intends they shall answer.

To make them, for example, correspond to the nine digits and a cipher, there must be ten cards, and at the top of nine of them must be wrote one of the digits, and on the tenth a cipher. These cards must be placed upon each other in the regular order, the number 1 being on the first, and the cipher at bottom. You then take the cards in your left hand, as is commonly done in shuffling, and taking off the two top cards, 1 and 2, you place the two following, 3 and 4, upon them; and under those four cards the three following 5, 6, and 7: at the top you put the cards 8 and 9, and at the bottom the card marked 0. Constantly placing in succession 2 at top and 3 at bottom, and they will then be in the following order :

8.9..3.4..1.2..5.6.7..0

If you shuffle them a second time, in the same manner, they will then stand in this order :

6.7..3.4..8.9..1.2.5..0

Thus, at every new shuffle, they will have a different order, as is expressed in the following lines :

1 shuffle 8.9.3.4.1.2.5.6.7.0
2 6.7.3.4.8.9.1.2.5.0
3 2.5.3.4.6.7.8.9.1.0
4 9.1.3.4.2.5.6.7.8.0
5 7.8.3.4.9.1.2.5.6.0
6 5.6.3.4.7.8.9.1.2.0
7 1.2.3.4.5.6.7.8.9.0

It is a remarkable property of this number, that the cards return to the order in which they were first placed, after a number of shuffles, which added to the number of columns that never change the order, is equal to the number of cards. Thus the number of shuffles is 7, and the number of columns in which the cards marked 3, 4, &c. never change their places is 3, which are equal to 10, the number of the cards. This property is not common to all numbers; the cards sometimes returning to the first order in less number, and sometimes in a greater number of shuffles than that of the cards.

TABLES OF COMBINATIONS, Constructed on the foregoing principles.

I. For ten numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	8	6	2
2	9	7	5
3	3	3	3
4	4	4	4
5	1	8	6
6	2	9	7
7	5	1	8
8	6	2	9
9	7	5	1
0	0	0	0

These

* It is easy from hence to determine whether a bet proposed at hazard, or any other game with the dice, be advantageous or not; if the dice be true; (which, by the way, is rarely the case for any long time together, as it is so easy for those that are possessed of a dexterity of hand to change the true dice for false).

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tion.

These tables, and the following examples at piquet except the 36th, appear to have been compiled by M. Guyot.

II. For twenty-four numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	15
11	1	23	21
12	2	24	22
13	5	13	5
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16

III. For twenty-seven numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	16
11	1	23	21
12	2	24	22
13	5	13	5
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16
25	25	25	25
26	26	26	26
27	27	27	27

* These letters should be wrote in capitals on one of the corners of each card, that the words may be easily legible when the cards are spread open.

† For the same reason if you would have the answer after one shuffle, the cards must be placed according to the first column of the table; or if after three shuffles, according to the third column.

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tion.

IV. For thirty-two numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	28	26	22
2	29	27	25
3	23	17	7
4	24	20	12
5	18	10	9
6	19	11	3
7	13	1	28
8	14	2	29
9	8	14	2
10	9	8	14
11	3	23	17
12	4	24	20
13	1	28	26
14	2	29	27
15	5	18	10
16	6	19	11
17	7	13	1
18	10	9	8
19	11	3	23
20	12	4	24
21	15	5	18
22	16	6	19
23	17	7	13
24	20	12	4
25	21	15	5
26	22	16	6
27	25	21	15
28	26	22	16
29	27	25	21
30	30	30	30
31	31	31	31
32	32	32	32

I. "Several letters that contain no meaning, being wrote upon cards, to make them, after they have been twice shuffled, give an answer to a question that shall be propoed; as for example, *What is love?*" Let 24 letters be wrote on as many cards, which, after they have been twice shuffled, shall give the following answer.

A dream of joy that soon is o'er.

First, write one of the letters in that line on each of the cards*. Then write the answer on a paper, and assign one of the 24 first numbers to each card, in the following order:

A D R E A M O F J O Y T H A T S O O N

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

I S O ' E R.

20 21 22 23 24

Next, write on another paper a line of numbers, from 1 to 24, and looking in the table for 24 combinations you will see that the first number after the second shuffle is 21, therefore the card that has the first letter of the answer, which is A, must be placed against that number, in the line of numbers you have just made†. In like manner the number 22 being the second of the same column, indicates that the card which answers to the second letter D of the answer, must

must be placed against that number : and so of the rest. The cards will then stand in the following order :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
O O F S A M N T O I S R H A E O ' E J O
20 21 22 23 24
R A D Y T

From whence it follows, that after these cards have been twice shuffled, they must infallibly stand in the order of the letters in the answer.

Observe 1. You should have several questions, with their answers, consisting of 24 letters, wrote on cards: these cards should be put in cases, and numbered, that you may know to which question each answer belongs. You then present the questions; and when any one of them is chose, you pull out the case that contains the answer, and shewing that the letters wrote on them make no sense, you then shuffle them, and the answer becomes obvious.

2. To make this experiment the more extraordinary, you may have three cards, on each of which an answer is wrote; one of which cards must be a little wider, and another a little longer, than the others. You give these three cards to any one, and when he has privately chose one of them he gives you the other two other, which you put in your pocket without looking at them, having discovered by feeling which he has chose. You then pull out the case that contains the cards that answer to his question, and perform as before.

3. You may also contrive to have a long card at the bottom, after the second shuffle. The cards may be then cut several times, till you perceive by the touch that the long card is at bottom, and then give the answer; for the repeated cuttings, however often, will make no alteration in the order of the cards.

The second of these observations is applicable to some of the subsequent experiments, and the third may be practised in almost all experiments with the cards. You should take care to put up the cards as soon as the answer has been shewn: so that if any one should desire the experiment to be repeated, you may offer another question, and pull out those cards than contain the answer.

Though this experiment cannot fail of exciting at all times pleasure and surprize, yet it must be owned that a great part of the applause it receives arises from the address with which it is performed.

II. "The 24 letters of the alphabet being wrote upon so many cards, to shuffle them, and pronounce the letters shall then be in their natural order; but that not succeeding, to shuffle them a second time, and then shew them in proper order." Write the 24 letters on the cards in the following order :

1 2 3 4 5 6 7 8 9 10 11 12
R S H Q E F T P G U X C
13 14 15 16 17 18 19 20 21 22 23 24
N O D Y Z I K & A B L M

The cards being disposed in this manner, shew them upon the table, that it may appear they are promiscuously marked. Then shuffle and lay them again on the table, pronouncing that they will be then in alphabetical order. Appear to be surprised that you have failed; take them up again and give them a second shuffle, and then counting them down on the table they

will all be in their natural order.

III. "Several letters being wrote promiscuously upon 32 cards, after they have been once shuffled, to find in a part of them a question; and then shuffling the remainder a second time, to shew the answer. Suppose the question to be, *What is each Briton's boast?* and the answer, *His liberty*; which taken together contain 32 letters."

After you have wrote those letters on 32 cards, write on a paper the words *his liberty*, and annex to the letters the first ten numbers thus :

H I S L I B E R T Y
1 2 3 4 5 6 7 8 9 10

Then have recourse to the table of combinations for ten numbers, and apply the respective numbers to them in the same manner as in experiment I. taking the first column, as these are to be shuffled only once, according to that order.

1 2 3 4 5 6 7 8 9 10
I B S L E R T H I Y

This is the order in which these cards must stand after the whole number 32 has been once shuffled, so that after a second shuffle they may stand in their proper order. Next dispose the whole number of letters according to the first column for 32 letters: the last ten are to be here placed in the order above; as follows,

W H A T I S E A C H B R I T O N ' S
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
B O A S T ?

18 19 20 21 22
I B S L E R T H I Y

Therefore, by the first column of the table, they will next stand thus :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
I T B R O N S C H B O A E A S T l o n g c a r d .
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
I I S B S L I B E R T W H I Y

You must observe that the card here placed the 16th in order, being the last of the question, is a long card; that you may cut them, or have them cut, after the first shuffle, at that part, and by that means separate them from the other ten cards that contain the answer.

Your cards being thus disposed, you show that they make no meaning; then shuffle them once, and cutting them at the long card, you give the first part to any one, who reads the question, but can find no answer in the others, which you open before him; you then shuffle them a second time, and show the answer as above.

IV. "To write 32 letters on so many cards, then shuffle and deal them by twos to two persons, in such manner, that the cards of one shall contain a question, and those of the other, an answer. Suppose the question to be, *Is nothing certain?* and the answer, *Yes, disappointment.*"

Over the letters of this question and answer, write the following numbers, which correspond to the order in which the cards are to be dealt by two and two.

I S N O T H I N G C E R T A I N ?
31 32 27 28 23 24 19 20 15 16 11 12 7 8 3 4
Y E S , D I S A P O I N T M E N T .
29 30 25 26 21 22 17 18 13 14 9 10 5 6 1 2

Combina-
tion.

Then have recourse to the first column of the table for 32 numbers, and dispose these 32 cards in the following order, by that column.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
O I E R G C A N T P I N T A I S
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
T M E H S D I N N O Y N T E I S

The cards being thus disposed, shuffle them once, and deal them two and two; when one of the parties will necessarily have the question, and the other the answer.

Instead of letters you may write words upon the 32 cards, 16 of which may contain a question, and the remainder the answer; or what other matter you please. If there be found difficulty in accommodating the words to the number of cards, there may be two or more letters or syllables wrote upon one card.

V. "The five beatitudes." The five blessings we will suppose to be, 1. Science, 2. Courage, 3. Health, 4. Riches, and 5. Virtue. These are to be found upon cards that you deal, one by one, to five persons. First write the letters of these words successively, in the order they stand, and then add the numbers here annexed to them.

S C I E N C E C O U R A G E
31 26 21 16 11 6 1 32 27 22 17 12 7 2
H E A L T H R I C H E S
28 23 18 13 8 3 29 24 19 14 9 4
V I R T U E
30 25 20 15 10 5

Then range them in order agreeable to the first column of the table for 32 numbers, as in the last experiment. Thus,

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
L H N A T E R E U A C R G T I U
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
E C I I C H S O H R E V S C

Next, take a pack of cards, and write on the four first the word Science; on the four next the word Courage and so of the rest.

Matters being thus prepared, you show that the cards on which the letters are wrote convey no meaning. Then take the pack on which the words are wrote, and spreading open the first four cards, with their backs upward, you desire the first person to choose one. Then close those cards and spread the next four to the second person; and so to all the five; telling them to hold up their cards lest you should have a confederate in the room.

You then shuffle the cards, and deal them one by one, in the common order, beginning with the person who chose the first card, and each one will find in his hand the same word as is wrote on his card. You will observe, that after the sixth round of dealing, there will be two cards left, which you give to the first and second persons, as their words contain a letter more than the others.

VI. "The cards of the game of piquet being mixed together, after shuffling them, to bring, by cutting them, all the cards of each suit together." The order in which the cards must be placed to produce the effect desired being established on the same principle as that explained in the experiment II. except that the shuf-

fling is here to be repeated three times, we think it will be sufficient to give the order in which they are to be placed before the first shuffle.

Combina-
tion.

Order of the Cards.

1 Ace	} clubs	17 King clubs
2 Knave		18 Ten
3 Eight	} diamonds	19 Nine } hearts
4 Seven		20 Seven clubs
wide card		
5 Ten clubs		21 Ace diamonds
6 Eight	} spades	22 Knave spades
7 Seven		23 Queen hearts
wide card		
8 Ten		24 Knave hearts
9 Nine	} diamonds	25 Ace spades
10 Queen		26 King diamonds
11 Knave		27 Nine clubs
12 Queen clubs		28 Ace } hearts
13 Eight	} hearts	29 King
14 Seven		30 Eight clubs
wide card		
15 Ten	} spades	31 King
16 Nine		32 Queen

You then shuffle the cards, and cutting at the wide card, which will be the seven of hearts, you lay the eight cards that are cut, which will be the suit of hearts, down on the table. Then shuffling the remaining cards a second time, you cut at the second wide card, which will be the seven of spades, and lay, in like manner, the eight spades down on the table. You shuffle the cards a third time, and offering them to any one to cut, he will naturally cut them at the wide card*, which is the seven of diamonds, and consequently divide the remaining cards into two equal parts, one of which will be diamonds and the other clubs.

VII. "The cards at piquet being all mixed together, to divide the pack into two unequal parts, and name "the number of points contained in each part." You are first to agree that each king, queen, and knave shall count, as usual, 10, the ace 1, and the other cards according to the number of the points. Then dispose the cards, by the table for 32 numbers, in the following order, and observe that the last card of the first division must be a wide card.

Order of the cards before shuffling.

1 Seven hearts	17 Nine diamonds
2 Nine clubs	18 Ace spades
3 Eight hearts	19 Ten clubs
4 Eight	20 Knave
5 Knave	} spades
6 Ten	
7 Queen	} clubs
8 Ace	
9 Ace hearts	} diamonds
wide card	
10 Nine hearts	26 Knave hearts
11 Queen spades	27 King clubs
12 Knave clubs	28 Nine } spades
13 Ten diamonds	29 King
14 Ten	30 Ace diamonds
15 King	} hearts
16 Queen	
	31 Seven
	32 Eight } clubs

You

* You must take particular notice whether they be cut at the wide card, and if they are not, you must have them cut, or cut them again yourself.

Combina-
tion.

You then shuffle them carefully, according to the method before described, and they will stand in the following order.

Cards.	Numbers.	Cards.	Numbers.
		brought up	34
1 Nine	9	6 Ten clubs	10
2 King	10	7 Ten diamonds	10
3 Seven	7	8 Ten hearts	10
4 Seven diamonds	7	9 Ace clubs	1
5 Ace spades	1	10 Ace hearts (wide card)	1
carried up	34	total	66
		Brought up	101
11 Eight hearts	8	22 Queen hearts	10
12 Eight spades	8	23 Nine	9
13 Seven hearts	7	24 Knave	8
14 Nine clubs	9	25 Eight	8
15 Knave	10	26 King	10
16 Ten	10	27 Queen	10
17 Queen clubs	10	28 Knave hearts	10
18 Nine hearts	9	29 King clubs	10
19 Queen spades	10	30 Ace diamonds	1
20 Knave clubs	10	31 Seven	7
21 King hearts	10	32 Eight	8
carried up	101	total	194

When the cards are by shuffling disposed in this order, you cut them at the wide card, and pronounce that the cards you have cut off contain 66 points, and consequently the remaining part 194.

VIII. "The Inconceivable Repique *." When you would perform this experiment with the cards used in the last, you must observe not to disorder the first 10 cards, in laying them down on the table. Putting those cards together, in their proper order, therefore, you shuffle them a second time in the same manner, and offer them to any one to cut, observing carefully if he cut them at the wide card, which will be the ace of hearts, and will then be at top; if not, you must make him, under some pretence or other, cut them till it is; and the cards will then be ranged in such order that you will repique the person against whom you play, though you let him choose (even after he has cut) in what suit you shall make the repique.

Order of the cards after they have been shuffled and cut.

1 Eight hearts	17 Nine	diamonds
2 Eight	18 Knave	diamonds
3 Knave	19 Nine hearts	
4 Ten	20 Queen spades	
5 Queen	21 Seven hearts	
6 Knave	22 Nine clubs	
7 King	23 Ten hearts	
8 Queen	24 Ace clubs	
9 Eight	25 Seven spades	
10 King	26 Seven diamonds	
11 Queen	27 Nine spades	
12 Ace	28 King	spades
13 Seven	29 Ace	spades
14 Eight	30 Ten clubs	
15 Knave hearts	31 Ten diamonds	
16 King clubs	32 Ace hearts (wide card)	

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tion

The cards being thus disposed, you ask your adversary in what suit you shall repique him. If he say in clubs or diamonds, you must deal the cards by threes, and the hands will be as follows,

Elder.	Younger.
Hearts, king	Clubs, ace
— queen	— king
— knave	— queen
— nine	— knave
— eight	— nine
— seven	Diamonds, ace
Spades, queen	— king
— knave	— queen
— eight	— knave
Diamonds, eight	— nine
Clubs, eight	Spades, ten
— seven	Hearts, ten
Rentrée, or take in of the elder.	Rentrée of the younger.
Seven spades	Ten clubs
Seven diamonds	Ten diamonds
Nine	Ace hearts
King	
spades	
Ace	

If he against whom you play, who is supposed to be elder hand, has named clubs for the repique, and has taken in five cards, you must then lay out the queen, knave, and nine of diamonds, and you will have, with the three cards you take in, a sixiem major in clubs, and quatorze tens. If he leave one or two cards, you must discard all the diamonds.

If he require to be repiqued in diamonds, then discard the queen, knave, and nine of clubs; or all the clubs, if he leave two cards; and you will then have a hand of the same strength as before.

Note, If the adversary should discard five of his hearts, you will not repique him, as he will then have a septiem in spades: or if he only take one card: but neither of these any one can do, who has the least knowledge of the game. If the person against whom you play would be repiqued in hearts or spades, you must deal the cards by twos, and the game will stand thus:

Elder hand.	Younger hand.
King	Ace
Knave	King
Nine	— clubs
Eight	Ace
Queen	— diamonds
Knave	Queen
Nine	— spades
Eight	Knave
Seven	Ten
Eight	King
Seven	Queen
Eight spades	— hearts
Rentrée.	Knave
Seven spades	Ten
Seven diamonds	—
Nine	—
King	—
spades	—
Ace	—

12 M

If

* This manœuvre of piquet was invented by the countess of L— (a French lady) and communicated by her to M. Guyot.

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tion.

If he require to be repiqued in hearts, you keep the quint to a king in hearts, and the ten of spades, and lay out which of the rest you please : then, even if he should leave two cards, you will have a fixiem major in hearts, and quatorze tens, which will make a repique.

But if he demand to be repiqued in spades : at the end of the deal you must dexterously pass the three cards that are at the bottom of the stock (that is, the ten of clubs, ten of diamonds, and ace of hearts) to the top*, and by that means you reserve the nine, king, and ace of spades for yourself : so that by keeping the quint in hearts, though you should be obliged to lay out four-cards, you will have a fixiem to a king in spades, with which and the quint in hearts, you must make a repique.

Observe here likewise, that if the adversary lay out only three cards, you will not make the repique : but that he will never do, unless he be quite ignorant of the game, or has some knowledge of your intention.

This last stroke of piquet has gained great applause, when those that have publicly performed it have known how to conduct it dexterously. Many persons who understand the nature of combining the cards, have gone as far as the passing the three cards from the bottom of the stock, and have then been forced to confess their ignorance of the manner in which it was performed.

IX. "The Metamorphosed Cards." Provide 32 cards that are differently coloured ; on which several different words are wrote, and different objects painted. These cards are to be dealt two and two, to four persons, and at three different times, shuffling them each time. After the first deal, every one's cards are to be of the same colour ; after the second deal, they are all to have objects that are similar ; and after the third, words that convey a sentiment.

Dispose of the cards in the following order.

Order of the cards.	Colours.	Objects.	Words.
1	Yellow	Bird	I find
2	Yellow	Bird	In you
3	Green	Flower	Charming
4	Green	Flower	Flowers
5	White	Bird	To hear
6	White	Orange	Beauty
7	Red	Butterfly	My
8	Red	Flower	Notes
9	Red	Flower	In
10	Red	Butterfly	Shepherdes
11	Green	Butterfly	Lover
12	Green	Butterfly	Your
13	White	Flower	Of
14	White	Flower	an inconstant
15	Yellow	Orange	Image
16	Yellow	Flower	Enchanting
17	White	Orange	Ardour
18	Yellow	Butterfly	My
19	Yellow	Butterfly	Phyllis.
20	White	Bird	Birds
21	Red	Orange	Sing
22	Red	Orange	Dear

23	Green	Orange	and sweetness	Combina- tion
24	Green	Orange	The	Comber.
25	Green	Bird	Of	
26	Green	Bird	Present	
27	Yellow	Flower	As	
28	Red	Bird	Changes	
29	Red	Bird	Bottom	
30	Yellow	Orange	Me	
31	White	Butterfly	Your	
32	White	Butterfly	I long	

The cards thus coloured, figured, and transcribed, are to be put in a case, in the order they here stand.

When you would perform this experiment you take the cards out of the case, and show, without changing the order in which they were put, that the colours, objects, and words are all placed promiscuously. You then shuffle them in the same manner as before, and deal them, two and two, to four persons, observing that they do not take up their cards till all are dealt, nor mix them together : and the eight cards dealt to each person will be found all of one colour. You then take each person's cards, and put those of the second person under those of the first, and those of the fourth person under those of the third. After which you shuffle them a second time, and having dealt them in the same manner, on the first person's cards will be painted all the birds ; on the second person's cards, all the butterflies ; on those of the third, the oranges ; and on those of the fourth, the flowers. You take the cards a second time, and observing the same precautions, shuffle and deal them as before, and then the first person, who had the last time the birds in his hand, will have the words that compose this sentence. *Sing, dear birds ; I long to hear your enchanting notes.*

The second person, who the last deal had the butterflies, will now have these words :

Of an inconstant lover your changes present me the image.

The third, who had the oranges, will have this sentence :

As in my Phyllis, I find in you beauty and sweetness.

The fourth, who had the flowers, will have these words :

Charming flowers, adorn the bosom of my shepherdess.

It seems quite unnecessary to give any further detail, as they who understand the foregoing experiments will easily perform this.

Among the different purposes to which the doctrine of combinations may be applied, those of writing in cipher, and deciphering, hold a principal place. See the article CIPHER.

COMBINATION, in chemistry, signifies the union of two bodies of different natures, from which a new compound body results. For example, when an acid is united with an alkali, we say that a combination betwixt these two saline substances takes place ; because from this union a neutral salt results, which is composed of an acid and an alkali.

COMBER, or CUMBER (Thomas), an eminent divine born at Westram in Kent, in 1645, was educated at Cambridge ;

* The manner of doing this is explained in the article LEGERDEMAIN.

Combustion
↓
Comedy.

Cambridge; created doctor of divinity; and, after several preferments in the church, was made dean of Durham. He was chaplain to Anne princess of Denmark, and to king William and queen Mary. He was author of several works, *viz.* 1. A scholastical history of the primitive and general use of Liturgies. 2. A Companion to the Altar. 3. A brief discourse upon the offices of baptism, catechism, and confirmation. He died in 1699, aged 55.

COMBUSTION, is the dissipation of the inflammable principle of any body by means of fire, whether this dissipation is attended with actual flame or not. See FLAME, and IGNITION.

COMEDY, a sort of dramatic poetry, which gives a view of common and private life, recommends virtue, and exposes the vices and follies of mankind in an humorous and merry way. Scaliger defines comedy a dramatic poem, representing the business of life, whose event is fortunate and still familiar. Vossius defines it a dramatic poem, copying the actions of the principal citizens and common people in a familiar stile, and not without mirth and raillery.

Critics are much divided about the nature of comedy. Aristotle calls it an imitation of the worst, or rather, of the lowest, class of persons, by way of ridicule. Mr Cornelle finds fault with this, and maintains, that the actions of kings themselves may enter comedy, provided they be such as are not very momentous, unattended with any considerable danger. Mr Congreve seems pretty much of the same sentiment: but Mr Dacier is of a contrary opinion: he maintains, that comedy allows of nothing grave or serious, unless it be turned to ridicule; and that raillery and ridicule are its only proper and genuine marks. Thus different are critics on the nature of comedy: nor are they better agreed concerning the characteristic which distinguishes it from tragedy. Some distinguish it by the lowliness of the subject; others by the ridiculous light it is set in. According to F. Bosfu, comedy differs from tragedy in this, that the comic writer invents both the names of his persons, and the action which he presents; whereas the tragic writers invent only the latter; the former they are to take from history.

Comedy has parts of quality and parts of quantity. Of the first kind there are four essential, the fable, the manners, the sentiments, and the diction; to which two are added, which only relate to the representation, *viz.* the music and decoration. See FABLE, MANNERS, &c.

The parts of quantity are also four. 1. The entrance. 2. The working up of the plot. 3. The full growth of the plot, or the counter-turn. 4. The discovery, or unravelling of the plot. These, in the language of the ancients, are called the *protasis*, *epitasis*, *catastasis*, and *catastrophe*. See the articles *PROTASIS*, *EPITASIS*, *ACT*, &c.

With regard to the various revolutions comedy has undergone, it is commonly distinguished into three kinds, *viz.* the ancient, the middle, and the new. The ancient comedy was sharp, satirical, and extremely abusive; even men of the first rank, if they were suspected of any criminal behaviour, whether the facts were true or false, were brought upon the

stage without any disguise, called by their own names, and used as severely as possible. Thus in the comedy of the Clouds, Aristophanes brings Socrates in by name. Indeed this liberty of abuse was allowed chiefly to the chorus, and was most used during the democracy of the Athenians, especially in the time of the Peloponnesian war. But when the thirty tyrants had seized the government, the middle comedy commenced; for it being no longer safe for the poets to rail at people in authority, and openly to charge magistrates with crimes, they still continued to ridicule the follies, and expose the vices of particular persons under fictitious names; by which the persons were so well pointed out, that it was no difficult matter to know them. At length, however, they were obliged, in the reign of Alexander the Great, to repress even this license; and this reformation gave occasion to the new comedy, which only brought upon the stage feigned adventures and imaginary names.

This last kind alone was received among the Romans, who nevertheless made a new subdivision of it into ancient, middle, and new, according to the various periods of the commonwealth. Among the ancient comedies were reckoned those of Livius Andronicus; among the middle those of Pacuvius; and among the new ones, those of Terence. They likewise distinguished comedy according to the quality of the persons represented, and the dress they wore, into *togata*, *prætextata*, *trabeata*, and *tabernaria*, which last agrees pretty nearly with our farces. Among us, comedy is distinguished from farce, as the former represents nature as she is; the other distorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous.

COMENIUS (John Amos), a grammarian and Protestant divine, born in Moravia in 1592. He was eminent for his design to introduce in a new method of teaching languages; for which purpose he published some essays in 1616, and had prepared some others, when the Spaniards pillaged his library, after having taken the city of Fulneck, where he was minister and master of the school. Comenius fled to Lesna, a city of Poland, and taught Latin there. The book he published in 1631, under the title of *Janua Linguarum restructa*, gained him a prodigious reputation, inasmuch that he was offered a commission for regulating all the schools in Poland. The parliament of England desired his assistance to regulate the schools in that kingdom. He arrived at London in 1641; and would have been received by a committee to hear his plan, had not the parliament been taken up with other matters. He therefore went to Sweden, being invited by a generous patron, who settled a stipend upon him that delivered him from the fatigues of teaching; and now he employed himself wholly in discovering general methods for those who instructed youth. In 1657 he published the different parts of his new method of teaching. He was not only taken up with the reformation of schools, but he also filled his brain with prophecies, the fall of antichrist, Millennium, &c. At last Comenius took it into his head to address Lewis XIV. of France, and to send him a copy of the prophecies of Drabicius; insinuating that it was to the

Comedy
↓
Comenius.

Comet
Comitia.

Comitia.

monarch God promised the empire of the world. He became sensible at last of the vanity of his labours, and died in 1671.

COMET, an opaque, spherical, and solid body like a planet, performing revolutions about the sun in elliptical orbits, which have the sun in one of their foci.

There is a popular division of comets into *tailed*, *bearded*, and *hairy* comets: though this division rather relates to the different circumstances of the same comet, than to the phenomena of several. Thus when the light is westward of the sun, and sets after it, the comet is said to be *tailed*, because the train follows it in the manner of a tail: when the comet is eastward of the sun, and moves from it, the comet is said to be *bearded*, because the light marches before it in the manner of a beard. Lastly, when the comet and the sun are diametrically opposite, (the earth between them), the train is hid behind the body of the comet, except a little that appears round it in form of a border of *hair*: and from this last appearance the word comet is derived; as *κομήτης*, *comēta*, comes from *κομῆναι*, *coma*, hair. But there have been comets whose disk was as clear, as round, and as well defined, as that of Jupiter, without either tail, beard, or coma. See ASTRONOMY, n° 7. 46.—64. where the nature and phenomena of comets are fully explained.

COMETARIUM, a curious machine, exhibiting an idea of the revolution of a comet about the sun. See ASTRONOMY, n° 318. and Plate LII. fig. 2.

COMETEAN, a town of Bohemia in the circle of Saltz, with a handsome town house. It was taken by storm in 1421, and all the inhabitants, men, women, and children, put to the sword. It is seated in a fertile plain, in E. Long. 13. 25. N. Lat. 50. 30.

COMINES (Philip de), an excellent historian, born of a noble family in Flanders, in 1446. He lived in a kind of intimacy with Charles the Bold, duke of Burgundy, for about eight years; but being seduced to the court of France by Lewis XI. he was highly promoted by him, and executed several successful negotiations. After this king's death he experienced many troubles on account of being a foreigner, by the envy of other courtiers, and lay long in prison before he was discharged: he died in 1509. Comines was a man of more natural abilities than learning; he spoke several living, but knew nothing of the dead languages: he has left behind him some memoirs of his own times, that are admired by all true judges of history. Catherine de Medicis used to say, that Comines made as many heretics in politics, as Luther had in religion.

COMINES, a town of French Flanders on the lines which the French have made to defend their country against the Austrian Netherlands. It is situated on the river Lis, in E. Long. 3. 1. N. Lat. 50. 30.

COMITIA, in Roman antiquity, were general assemblies of the people, lawfully called by some magistrate for the enjoyment or prohibition of any thing by their votes.

The proper comitia were of three sorts; *curiata*, *centuriata*, and *tributa*; with reference to the three grand divisions of the city and people into *curiæ*, *centuriæ*, and *tribes*: For, by comitia *calata*, which we sometimes meet with in authors, in elder times were

meant all the comitia in general; the word *calata* from *καλέω*, or *calo*, being their common epithet; though it was at last restrained to two sorts of assemblies, those for the creation of priests, and those for the regulation of last-wills and testaments.

The *comitia curiata* owe their origin to the division which Romulus made of the people into 30 *curiæ*; ten being contained in every tribe. They answered in most respects to the parishes in our cities, being not only separated by proper bounds and limits, but distinguished too by their different places set apart for the celebration of divine service, which was performed by particular priests, (one to every *curia*), with the name of *curiones*.

Before the institution of the comitia centuriata, all the grand concerns of the state were transacted in the assembly of the *curiæ*; as the election of kings and other chief officers, the making and abrogating of laws, and the judging of capital causes. After the expulsion of the kings, when the commons had obtained the privilege to have tribunes and ædiles, they elected them for some time at these assemblies; but that ceremony being at length transferred to the comitia tributa, the *curiæ* were never convened to give their votes, except now and then upon account of making some particular law relating to adoptions, wills, and testaments, or the creation of officers for an expedition; or for the electing some of the priests, as the *flamines*, and the *curio maximus*, or superintendent of the *curiones*, who were themselves chosen by every particular *curia*.

The power of calling these assemblies belonged at first only to the kings; but upon the establishment of the democracy, the same privilege was allowed to most of the chief magistrates, and sometimes to the pontifices.

The persons who had the liberty of voting here were such Roman citizens as belonged to the *curiæ*; or such as actually lived in the city, and conformed to the customs and rites of their proper *curiæ*; all those being excluded who dwelt without the bounds of the city, retaining the ceremonies of their own country, though they had been honoured with the *jus civitatis*, or admitted free citizens of Rome. The place where the curia met was the *comitium*, a part of the forum: No set time was appointed for the holding these, or any other of the comitia, but only as business required.

The people being met together, and confirmed by the report of good omens from the augurs, (which was necessary in all the assemblies), the rogatio, or business to be proposed to them, was publicly read. After this, (if none of the magistrates interposed), upon the order of him that presided in the comitia, the people divided into their proper *curiæ*, and consulted of the matter; and then the *curiæ* being called out, as it happened by lot, gave their votes man by man, in ancient times *viva voce*, and afterwards by tablets; the most votes in every *curia* going for the voice of the whole *curia*, and the most *curiæ* for the general consent of the people.

In the time of Cicero, the comitia curiata were so much out of fashion, that they were formed only by 30 lictors representing the 30 *curiæ*; whence, in his second

Comitia. Second oration against Rullus, he calls them *comitia aduimbrata*.

Comitia.

The *comitia centuriata* were instituted by Servius Tullius: who, obliging every one to give a true account of what he was worth, according to those accounts, divided the people into six ranks or classes, which he subdivided into 193 centuries. The first class, containing the equites and richest citizens, consisted of 98 centuries. The second, taking in the tradesmen and mechanics, consisted of 22 centuries. The third, 20. The fourth, 22. The fifth, 30. The sixth, filled up with the poorer sort, but one century: and this, though it had the same name with the rest, yet was seldom regarded, or allowed any power in public matters. Hence it is a common thing with the Roman authors, when they speak of the classes, to reckon no more than five, the sixth not being worth their notice. This last class or order was divided into two parts, or orders; the *proletarii*, and the *capite censi*. The former, as their name implies, were designed purely to stock the republic with men, since they could supply it with so little money; and the latter, who paid the lowest tax of all, were rather counted and marshalled by their heads, than by their estates.

Persons of the first rank, by reason of their pre-eminence, had the name of *classici*; whence came the name of *classici auctores*, for the most approved writers. All others, of what classis soever, were said to be *infra classem*. The assembly of the people by centuries, was held for the electing of consuls, censors, and prætors; as also for the judging of persons accused of what they called *crimen perduellionis*, or actions by which the party had shewed himself an enemy to the state, and for the confirmation of all such laws as were proposed by the chief magistrates, who had the privilege of calling these assemblies.

The place appointed for their meeting was the *campus martius*; because in the primitive times of the commonwealth, when they were under continual apprehensions of enemies, the people, to prevent any sudden assault, went armed, in martial order, to hold these assemblies; and were for that reason forbid by the laws to meet in the city, because an army was upon no account to be marshalled within the walls: yet, in latter ages, it was thought sufficient to place a body of soldiers as a guard in the janiculum, where an imperial standard was erected, the taking down of which denoted the conclusion of the comitia.

Though the time of holding these comitia for other matters was undetermined; yet the magistrates, after the year of the city 601, when they began to enter on their place, on the kalends of January, were constantly *designati* about the end of July, and the beginning of August.

All the time between their election and confirmation they continued as private persons, that inquiry might be made into the election, and the other candidates might have time to enter objections, if they met with any suspicion of foul dealing. Yet, at the election of the censors, this custom did not hold; but as soon as they were elected, they were immediately invested with the honour.

By the institution of these comitia, Servius Tullius

secretly conveyed the whole of the power from the commons: for the centuries of the first and richest class being called out first, who were three more in number than all the rest put together, if they all agreed, as generally they did, the business was already decided, and the other classes were needless and insignificant. However, the three last scarce ever came to vote.

The commons, in the time of the free state, to remedy this disadvantage, obtained, that before they proceeded to voting any matter at these comitia, that century should give their suffrages first upon whom it fell by lot, with the name of *centuria prerogativa*; the rest being to follow according to the order of their classes. After the constitution of the 35 tribes into which the classes and their centuries were divided, in the first place, the tribes cast lots, which should be the *prerogative tribe*; and then the centuries of the tribes for the honour of being a prerogative century. All the other tribes and centuries had the appellation of *jure vocata*, because they were called out according to their proper places.

The prerogative century being chosen by lot, the chief magistrate, sitting in a tent in the middle of the *campus martius*, ordered that century to come out and give their voices; upon which they presently separated from the rest of the multitude, and came into an inclosed apartment, which they termed *septa*, or *ovilia*, passing over the *pontes* or narrow boards laid there for the occasion; on which account, *de ponte deici* signifies to be denied the privilege of voting, and persons thus dealt with are called *d. pontani*.

At the higher end of the *pontes* stood the *diribitores*, (a sort of under officers so called from their marshalling the people), and delivered to every man, in the election of magistrates, as many tablets as there appeared candidates, one of whose names was written upon every tablet. A proper number of great chests were set ready in the *septa*, and every body threw in which tablet he pleased.

By the chests were placed some of the public servants, who taking out the tablets of every century, for every tablet, made a prick or a point in another tablet which they kept by them. Thus, the business being decided by moist points, gave occasion to the phrase *omne tulit punctum*, and the like.

The same method was observed in the judiciary process at these comitia, and in the confirmation of laws; except that, in both these cases, only two tablets were offered to every person, on one of which was written U. R. and on the other A, in capital letters; the two first standing for *uti rogatus* "be it as you desire," relating to the magistrate who proposed the question; and the last for *utique*, or "I forbid it."

It is remarkable, that though in the election of magistrates, and in the ratification of laws, the votes of that century, whose tablets were equally divided, signified nothing; yet in trials of life and death, if the tablets *pro* and *con* were the same in number, the person was actually acquitted.

The division of people into tribes was an invention of Romulus, after he had admitted the Sabines into Rome; and though he constituted at that time only three, yet as the state encreased in power, and the city

Comitia
||
Comma.

city in number of inhabitants, they rose by degrees to 35. For a long time after this institution, a *tribe* signified no more than such a space of ground with its inhabitants. But at last the matter was quite altered, and a tribe was no longer *pars urbis*, but *civitatis*; not a quarter of the city, but a company of citizens living where they pleased. This change was chiefly occasioned by the original difference between the tribes in point of honour. For Romulus having committed all sordid and mechanic arts to the care of strangers, slaves, and libertines; and reserved the more honest labour of agriculture to the freemen and citizens, who by this active course of life might be prepared for martial service; the *tribus rusticae* were for this reason esteemed more honourable than the *tribus urbanae*. And now all persons being desirous of getting into the more creditable division; and there being several ways of accomplishing their wishes, as by adoption, by the power of censors, or the like; that rustic tribe which had the most worthy names in its roll, had the preference to all others, though of the same general denomination. Hence all of the same great family, bringing themselves by degrees into the same tribe, gave the name of their family to the tribe they honoured; whereas at first the generality of the tribes did not borrow their names from persons but from places.

The first assembly of the tribes we meet with is about the year of Rome 263, convened by Sp. Sicius, tribune of the commons, upon account of the trial of Coriolanus. Soon after, the tribes of the commons were ordered to be elected here; and at last, all the inferior magistrates, and the collegiate priests. The same comitia served for the enacting of laws relating to war and peace, and all others proposed by the tribunes and plebeian officers, though they had not properly the name of *leges* but *plebiscita*. They were generally convened by the tribunes of the commons; but the same privilege was allowed to all the chief magistrates. They were confined to no place; and therefore sometimes we find them held in the comitium, sometimes in the campus martius, and now and then in the capitol. The proceedings were in most respects answerable to those already described in the account of the other comitia, and therefore need not be insisted on. Only we may farther observe of the comitia in general, that when any candidate was found to have most tables for a magistracy, he was declared to be *designatus* or elected by the president of the assembly; and this they termed *renunciari consul, praetor*, or the like: and that the last sort of the comitia only could be held without the consent and approbation of the senate, which was necessary to the convening of the other two.

COMITIALIS MORBUS, an appellation given to the EPILEPSY, by reason the comitia of ancient Rome were dissolved if any person in the assembly happened to be taken with this distemper.

COMITIUM, in Roman antiquity, a large hall in the forum, where the COMITIA were ordinarily held.

COMMA, among grammarians, a point or character marked thus (,) serving to denote a short stop, and to divide the members of a period. Different authors define and use it differently. According to F.

Comma
||
Commandry.

Buffier, the comma serves to distinguish the members of a period, in each of which is a verb and the nominative case of the verb: thus, "That so many people are pleased with trifles, is owing to a weakness of mind, which makes them love things easy to be comprehended." Besides this, the comma is used to distinguish in the same member of a period, several nouns-substantive, or nouns-adjective, or verbs not united by a conjunction: thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without studying constantly, methodically, with a gust, application, &c." If those words are united in the same phrase with a conjunction, the comma is omitted; thus, "The imagination and the judgment do not always agree."

The ingenious author of the tract *De ratione interpungendi*, printed with Vossius's Element. Rhetor. Lond. 1724, lays down the use of a comma to be, to distinguish the simple members of a period or sentence; i. e. such as only consist of one subject, and one definite verb. But this rule does not go throughout; the same author instancing many particular cases not yet included herein, where yet the comma is advisable. See PUNCTUATION.

It is a general rule that a comma ought not to come between a nominative and a verb, or an adjective and substantive, when these are not otherwise disjoined: thus, in the sentence, *God ruleth with infinite wisdom*, a comma between *God* and *ruleth*, or between *infinite* and *wisdom*, would be absurd. But to this exceptions may occur; as when not a single word, but a sentence, happens to be the nominative: thus in the example first above given, where the sentence *that so many people are pleased with trifles*, forms the nominative to the verb *is*, a comma at trifles is proper, both for the sake of perspicuity, and as coinciding with a slight natural pause.

COMMA, in music. See INTERVAL.

COMMANDINUS (Frederic), born at Urbino in Italy, and descended from a very noble family, in the 16th century. To a vast skill in the mathematics, he had added a great knowledge in the Greek tongue, by which he was well qualified to translate the Greek mathematicians into Latin: accordingly he translated and published several, which no writer till then had attempted; as Archimedes, Apollonius, Euclid, &c.

COMMANDRY, a kind of benefice or fixed revenue belonging to a military order, and conferred on ancient knights who had done considerable services to the order.

There are strict or regular commandries, obtained in order, and by merit; there are others of grace and favour, conferred at the pleasure of the grand master. There are also commandries for the religious, in the orders of St Bernard and St Anthony. The kings of France have converted several of the hospitals for lepers into commandries of the order of St Lazarus.

The commandries of Malta are of different kinds; for as the order consists of knights, chaplains, and brothers-servitors, there are peculiar commandries or revenues attached to each. The knight to whom one of these benefices or commandries is given, is called *commander*: which agrees pretty nearly with the præpositus

Commelinæ præpositus set over the monks in places at a distance from the monastery, whose administration was called *obedientia*; because depending entirely upon the abbot who gave him his commission. Thus it is with the simple commanders of Malta, who are rather farmers of the order than beneficiaries; paying a certain tribute or rent, called *responsio*, to the common treasure of the order.

COMMELINA, in botany, a genus of the monogynia order, belonging to the triandria class of plants. There are 10 species, all of them natives of warm climates. They are herbaceous plants, rising from two to four feet high, and adorned with blue or yellow flowers. Their culture differs in nothing from that of the common exotics.

COMMEMORATION, in a general sense, the remembrance of any person or thing, or the doing any thing to the honour of a person's memory, or in remembrance of any past event. Thus, the eucharist is a commemoration of the sufferings of Jesus Christ.

COMMENDAM, in the ecclesiastical law, the trust or administration of the revenues of a benefice, given either to a layman, to hold by way of depositum for six months, in order to repairs, &c. or to an ecclesiastic or beneficed person, to perform the pastoral duties thereof, till once the benefice is provided with a regular incumbent.

Anciently, the administration of vacant bishoprics belonged to the nearest neighbouring bishop; which is still practised between the archbishopric of Lyons, and the bishopric of Autun: on this account they were called *commendatory bishops*.

This custom appears to be very ancient. S. Athanasius says of himself, according to Nicephorus, that there had been given him in *commendam*, i. e. in administration, another church besides that of Alexandria whereof he was stated bishop.

The care of churches, it seems, which had no pastor, was committed to a bishop, till they were provided of an ordinary: the register of pope Gregory I. is full of these commissions, or *commendams*, granted during the absence or sickness of a bishop, or the vacancy of the see.

Some say, that pope Leo IV. first set the modern *commendams* on foot, in favour of ecclesiastics who had been expelled their benefices by the Saracens; to whom the administration of the vacant churches was committed for a time, in expectation of their being restored: though S. Gregory is said to have used the same, while the Lombards desolated Italy.

In a little time the practice of *commendams* was exceedingly abused; and the revenues of monasteries

given to laymen for their subsistence. The bishops also procured several benefices, or even bishoprics, in *commendam*, which served as a pretext for holding them all without directly violating the canons. Part of the abuse has been retrenched; but the use of *commendams* is still retained, as an expedient to take off the incompatibility of the person by the nature of the benefice.

When a parson is made bishop, his parsonage becomes vacant; but if the king give him power, he may still hold it in *commendam*.

COMMENDATUS, one who lives under the protection of a great man. *Commendati homines*, were persons who, by voluntary homage, put themselves under the protection of any superior lord: for ancient homage was either *predial*, due for some tenure; or *personal*, which was by compulsion, as a sign of necessary subjection; or voluntary, with a desire of protection: and those who, by voluntary homage, put themselves under the protection of any men of power, were sometimes called *homines ejus commendati*, as often occurs in Domesday. *Commendati dimidii*, were those who depended on two several lords, and paid one-half of their homage to each; and *sub-commendati* were like under-tenants under the command of persons that were themselves under the command of some superior lord: also there were *dimidii sub-commendati*, who bore a double relation to such depending lords. This phrase seems to be still in use, in the usual compliment, "Commend me to such a friend," &c. which is to let him know, "I am his humble servant."

COMMENSURABLE, among geometricians, an appellation given to such quantities as are measured by one and the same common measure.

COMMENSURABLE Numbers, whether integers or fractions, are such as can be measured or divided by some other number without any remainder: such are 12 and 18, as being measured by 6 and 3.

COMMENSURABLE in Power, is said of right lines, when their squares are measured by one and the same space or superficies.

COMMENSURABLE Surds, those that being reduced to their least terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational one.

COMMENTARY, or **COMMENT**, in matters of literature, an illustration of the difficult or obscure passages of an author.

COMMENTARY, or **COMMENTARIES**, likewise denotes a kind of history, or memoirs of certain transactions, wherein the author had a considerable hand: such are the commentaries of Cæsar.

Commendatus
†
Commentary.

C O M M E R C E,

CHAP. I. HISTORY of COMMERCE.

§ i. General History.

IS an operation by which the wealth, or work, either of individuals or of societies, may be exchanged by a set of men called *merchants*, for an equivalent, proper for supplying every want, without any interruption to industry, or any check upon consumption.

It is a point as yet undecided by the learned, to what nation the invention and first use of commerce belonged;

belonged ; some attribute it to one people, some to another, for reasons that are too long to be discussed here. But it seems most probable that the inhabitants of Arabia were those that first made long voyages. It must be allowed, that no country was so happily seated for this purpose as that which they inhabited, being a peninsula washed on three sides by three famous seas, the Arabian, Indian, and Persian. It is also certain, that it was very early inhabited ; and the first notice we have of any considerable trade refers it to the Ishmaelites, who were settled in the lither part of Arabia. To them Joseph was sold by his brethren, when they were going down with their camels to Egypt with spicery, balm, and myrrh. It may seem strange to infer from hence, that commerce was already practised by this nation, since mention is here made of camels, or a caravan, which certainly implies an inland trade ; and it must be likewise allowed, that balm and myrrh were the commodities of their country. But whence had they the spicery ? Or how came Arabia to be so famous in ancient times for spices ? Or whence proceeded that mistake of many great authors of antiquity, that spices actually grew there ? Most certainly, because these people dealt in them ; and that they dealt in them the first of any nation that we know of, appears from this very instance. Strabo and many other good authors assure us, that in succeeding times they were very great traders ; they tell us particularly what ports they had ; what prodigious magazines they kept of the richest kinds of goods, what wonderful wealth they obtained ; in what prodigious magnificence they lived, and into what excesses they fell in respect to their expences for carving, building, and statues. All this shews that they were very great traders ; and it also shews, that they traded to the East Indies ; for from thence only they could have their spices, their rich gums, their sweet-scented woods, and their ivory, all which it is expressly said that they had in the greatest abundance. This therefore proves, that they had an extensive and flourishing commerce ; and that they had it earlier than any other nation, seems to me evident from their dealing at that time in spices. Besides, there is much less difficulty in supposing that they first discovered the route to the Indies, than if we ascribe that discovery to any other nation : for in the first place they lay nearest, and in the next they lay most conveniently ; to which we may add thirdly, that as the situation of their country naturally inclined them to navigation, so by the help of the monsoons they might make regular voyages to and from the Indies with great facility ; nor is it at all unlikely that this discovery might be at first owing to chance, and to some of their vessels being blown by a strong gale to the opposite coast, from whence they might take the courage to return, by observing the regularity of the winds at certain seasons. All these reasons taken together seem to favour this opinion, that commerce flourished first among them ; and as to its consequences in making them rich and happy, there is no dispute about them.

We find in the records of antiquity no nation celebrated more early for carrying all arts to perfection than the inhabitants of Egypt ; and it is certain also, that no art was there cultivated more early, with

more assiduity, or with greater success, than trade. It appears from the foregoing instance, that the richest commodities were carried thither by land ; and it is no less certain, that the most valuable manufactures were invented and brought to perfection there many ages before they were thought of in other countries ; for, as the learned Dr Warburton very justly observes, at the time that Joseph came into Egypt, the people were not only possessed of all the conveniences of life, but were remarkable also for their magnificence, their politeness, and even for their luxury ; which argues, that traffic had been of long standing amongst them. To say the truth, the great advantages derived from their country's lying along the Red Sea, and the many benefits that accrued to them from the Nile, which they very emphatically called *the river*, or *the river of Egypt*, and of which they knew how to make all the uses that can be imagined, gave them an opportunity of carrying their inland trade not only to a greater height than in any country at that time, but even higher than it has been carried any where, China only excepted ; and some people have thought it no trivial argument to prove the descent of the Chinese from the Egyptians, that they have exactly the same sort of genius, and with wonderful industry and care have drawn so many cuts and canals, that their country is almost in every part of it navigable. It was by such methods, by a wife and well-regulated government, and by promoting a spirit of industry amongst the people, that the ancient Egyptians became so numerous, so rich, so powerful ; and that their country, for large cities, magnificent structures, and perpetual abundance, became the glory and wonder of the old world.

The Phenicians, though they possessed only a narrow slip of the coast of Asia, and were surrounded by nations so powerful and so warlike that they were never able to extend themselves on that side, became famous, by erecting the first naval power that makes any figure in history, and for the raising of which they took the most prudent and effectual measures. In order to this, they not only availed themselves of all the creeks, harbours, and ports, which nature had bestowed very liberally on their narrow territory, but improved them in such a manner, that they were no less remarkable for their strength, than considerable for their conveniency ; and so attentive they were to whatever might contribute to the increase of their power, that they were not more admired for the vast advantages they derived from their commerce, than they were formidable by their fleets and armies. They were likewise celebrated by antiquity as the inventors of arithmetic and astronomy ; and in the last mentioned science they must have been very considerable proficient, since they had the courage to undertake long voyages at a time when no other nation (the Arabians and Egyptians excepted) durst venture farther than their own coasts. By these arts Tyre and Sidon became the most famous marts in the universe, and were resorted to by all their neighbours, and even by people at a considerable distance, as the great storehouses of the world. We learn from the Scriptures, how advantageous their friendship and alliance became to the two great kings of Israel, David and

and Solomon; and we see, by the application of the latter for architects and artists to Hiram king of Tyre, to what a prodigious height they had carried manufactures of every kind.

It is very certain that Solomon made use of their assistance in equipping his fleets at Elath and Eziongaber; and it is very probable that they put him upon acquiring those ports, and gave him the first hints of the amazing advantages that might be derived from the possession of them, and from the commerce he might from thence be able to carry on. These ports were most commodiously situated on the Arabian gulph; and from thence his vessels, manned chiefly by Phœnicians, sailed to Ophir and Tharhis, where-ever those places were. Some writers will needs have them to be Mexico and Peru, which is certainly a wild and extravagant supposition; others believe that we are to look for Ophir on the coast of Africa, and Tharhis in Spain; but the most probable opinion is, that they were both seated in the East Indies. By this adventurous navigation he brought into his country curiosities not only unseen, but unheard of before, and riches in such abundance, that, as the Scripture finely expresses it, *He made silver in Jerusalem as stones, and cedar-trees as sycamores that grew in the plains.* The metaphor is very bold and emphatical; but when we consider that it is recorded in this History, that the return of one voyage only to Ophir produced 450 talents of gold, which makes 51,328 pounds of our Troy weight, we cannot doubt of the immense profit that accrued from this commerce. It is also observable, that the queen of Sheba, or Saba, which lies in that part of Arabia before-mentioned, surprised at the reports that were spread of the magnificence of this prince, made a journey to his court on purpose to satisfy herself, whether fame had not exaggerated the fact; and from the presents she made him of 120 talents of gold, of spices in great abundance, and precious stones, we may discern the true reason of her curiosity, which proceeded from an opinion that no country could be so rich as her own. And there is another circumstance very remarkable, and which seems strongly to fortify what we have advanced in the beginning of this section; it is added, *neither were there any such spices as the queen of Sheba gave to king Solomon;* which seems to intimate, that the Arabians had penetrated farther into the Indies than even the fleets of this famous prince, and brought from thence other spices (perhaps nutmegs and cloves) than had ever been seen before. It was by his wisdom, and by his steady application to the arts of peace, all of which mutually support each other, as they are all driven on by the wheel of commerce, which supplies every want, and converts every superfluity into merchandise, that this monarch raised his subjects to a condition much superior to that of any of their neighbours, and rendered the land of Israel, while he governed it, the glory and wonder of the East. He made great acquisitions without making wars; and his successor, by making wars, lost those acquisitions. It was his policy to keep all his people employed; and, by employing them, he provided equally for the extension of their happiness, and his own power: but the following kings pursued other

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measures, and other consequences attended them. The trade of Judea sunk almost as suddenly as it rose, and in process of time they lost those ports on the Red Sea, upon which their Indian commerce depended.

The whole trade of the universe became then, as it were, the patrimony of the Phœnicians and the Egyptians. The latter monopolized that of the Indies, and, together with her corn and manufactures, brought such a prodigious balance of wealth continually into the country, as enabled the ancient monarchs of Egypt to compals all those memorable works that in spite of time and barbarous conquerors remain the monuments of their wisdom and power, and are like to remain so as long as the world subsists. The Phœnicians drew from Egypt a great part of those rich commodities and valuable manufactures which they exported into all the countries between their own and the Mediterranean sea; they drew likewise a vast resort to their own cities, even from countries at a great distance; and we need only look into the prophets Isaiah and Ezekiel in order to be convinced, that these governments, founded on trade, were infinitely more glorious and more stable than those that were erected by force. All this we find likewise confirmed by profane histories; and by comparing these, it is evident, that the industry of the inhabitants of this small country triumphed over all obstacles, procured the greatest plenty in a barren soil, and immense riches, where, without industry, there must have been the greatest indigence. It is true, that old Tyre was destroyed by Nebuchadnezzar, but not till she had flourished for ages; and even then she fell with dignity, and after a resistance that ruined the army of the Great Conqueror of Asia. Out of the ashes of this proud city the great spirit of its inhabitants produced a Phoenix, little, if at all, inferior in beauty to its parent. New Tyre was situated on an island; and though her bounds were very narrow, yet she became quickly the mistress of the sea, and held that supreme dominion till subdued by Alexander the Great, whom no power could resist. The struggle she made, however, though unsuccessful, was great, and very much to the honour of her inhabitants: it must be owned, that the Greek hero found it more difficult to master this single place, than to overcome the whole power of Persia.

The views of the Macedonian prince were beyond comparison more extensive than his conquests; and whoever considers Alexander's plan of power, and enters into it thoroughly, will think him more a politician than he was a conqueror. He framed in his own mind an idea of universal monarchy, which it was indeed impossible to accomplish; but the very notion of it does him far greater honour than all his victories. He thought of placing his capital in Arabia; and of disposing things in such a manner, as to have commanded the most remote parts of the Indies, at the same time that he maintained a connection with the most distant countries in Europe. He was for making use of force to acquire, but he very well knew, that commerce only could preserve, an empire, that was to have no other limits than those which nature had assigned the world. He desired to be master of all; but at the same time he was willing to be

a wife and gracious master, and to place his happiness in that of his people, or rather, in making all the nations of the earth but one people. A vast, an extravagant, an impracticable scheme it was, of which he lived not long enough to draw the out-lines; but the sample he left in his new city of Alexandria sufficiently shews how just and how correct his notions were, and how true a judgment he had formed of what might be effected by those methods upon which he depended. That city, which he might be said to design with his own hand, and which was built, as it were, under his eye, became in succeeding times all that he expected, the glory of Egypt, and the centre of commerce for several ages.

While Tyre was in the height of her glory, and had no rival in the empire of the sea, she founded her noble colony of Carthage on the coast of Africa. The situation of the city was every way admirable; whether considered in the light of a capital, of a strong fortress, or of a commodious port. It was equally distant from all the extremities of the Mediterranean sea, had a very fine country behind it, and was not in the neighbourhood of any power capable of restraining its commerce or its growth. It is almost inexpressible how soon its inhabitants became not only numerous and wealthy, but potent and formidable. By degrees they extended themselves on all sides, conquered the best part of Spain, and erected there a new Carthage; the islands of Sicily and Sardinia, or at least the best part of them, submitted likewise to their yoke. But their conquests, however, were inconsiderable in extent, when compared with their navigation. On one side they stretched as far westward as Britain; and the Scilly islands, which are now so inconsiderable, were to them an Indies, the route to which they used the utmost industry to conceal. On the other hand, they discovered a great part of the coast of Africa, the Canary islands; and some there are, who believe they first found the way to America. While they confined themselves to trade, and the arts which belonged thereto, their power was continually increasing; but when industry gave way to luxury, and a spirit of ambition banished their old maxims of frugality and labour, their acquisitions remained at a stand. The Romans began to grow jealous of their naval power, which it cost them two obnoxious wars of 40 years continuance to humble. When she was at length destroyed, her very ruins were majestic; for at the beginning of the third fatal Punic war, this city contained 700,000 inhabitants alone, and had 300 cities in Africa under her dominion. Such was the empire of Carthage, raised entirely by commerce; and to which, if she had been content to have applied herself with the same steadiness in her highest prosperity as in her early beginnings, there is no doubt she had preferred her freedom much longer than she did; for as thrift, and diligence, and good faith, are the pillars of a commercial state, so when these are once shaken, it is not only natural that she should decline, but unavoidable also.

The Ptolemies, who were the successors of Alexander in Egypt, entered deeply into that hero's scheme, and reaped the benefit of his wise establishment. Ptolemy Philadelphus, by encouraging trade, made his subjects immensely rich, and himself inexpressibly

powerful. We are told by an ancient author, that he had 120 galleys of war of an enormous size, and upwards of 4000 other vessels, small and great. This would appear incredible, if other wonders were not related of him, which seem to explain and confirm these. He raised a new city on the coast of the Red Sea; he was at an immense expence in opening harbours, constructing quays, in raising inns at proper distances on the road, and in cutting a canal from sea to sea. A prince who comprehended the importance of commerce to a degree that induced him to dare such expences as these, might have what treasures, what armies, what fleets he pleased. In his time, Alexandria appeared in pomp and splendour. She owed her birth to Alexander; but it was Ptolemy, who caught a double portion of his master's spirit, which raised her to that magnificence that ages could not deface. We may guess at what she was in her glory, by what we are told was the produce of her customs, which fell little short of two millions of our money annually; and yet we cannot suppose that Ptolemy, who understood trade so well, would cramp it by high duties, or extravagant impositions. When the revenue of the prince from a single port was so great, what must have been the riches of his subjects!

But what shews us Alexandria in the highest point of light, is the credit she maintained after Egypt sunk from an empire into a province. The Romans themselves were struck with the majesty of her appearance; and though till then they had little regarded traffic, yet they were not long before they comprehended the advantages of such a port, and such a mart as Alexandria; they confirmed her privileges, they protected her inhabitants, they took every measure possible to preserve her commerce, and this with so good an effect, that she actually preserved it longer than Rome herself could preserve her power. She followed, indeed, the fortune of the empire, and became at last dependent upon Constantinople, when its founder removed thither the capital of the empire; and his successor found means to transfer also a part of the trade of Alexandria to the same place. Yet this city continued still to hold up her head, and tho' she sunk under the barbarous power of the Arabs, yet they grew polished by degrees; by degrees she recovered somewhat of her ancient pre-eminence; and though she never rose to any thing like her former lustre, yet she remained the centre of what little trade there was in the world; which is more than can be said of almost any place that has fallen under the Mohammedan power.

When the Roman empire was over-run by barbarians, and arts and sciences sunk with that power which had cultivated and protected them, commerce also visibly declined; or, to speak with greater propriety, was overwhelmed and lost. When that irruption of various nations had driven the Roman policy out of the greatest part of Europe, some straggling people, either forced by necessity, or led by inclination, took shelter in a few straggling islands that lay near the coast of Italy, and which would never have been thought worth inhabiting in a time of peace. This was in the 6th century; and at their first fixing there they had certainly nothing more in view than living in a tolerable

able state of freedom, and acquiring a subsistence as well as they could. These islands being divided from each other by narrow channels, and those channels so incumbered by shallows that it was impossible for strangers to navigate them, these refugees found themselves tolerably safe; and, uniting amongst themselves for the sake of improving their condition, and augmenting their security, they became in the 8th century a well-settled government, and assumed the form of a republic.

Simple and mean as this relation may appear, yet it is a plain and true account of the rise, progress, and establishment of the famous and potent republic of Venice. Her beginnings were indeed weak and slow; but when the foundation was once well laid, her growth was quick, and the increase of her power amazing. She extended her commerce on all sides; and taking advantage of the barbarous maxims of the Mohammedan monarchies, she drew to herself the profits of the Indian trade, and might, in some sense, be said to make Egypt a province, and the Saracens her subjects. By this means her traffic swelled beyond conception; she became the common mart of all nations; her naval power arrived at a prodigious height; and, making use of every favourable conjuncture, she stretched her conquest not only over the adjacent Terra Firma of Italy, but though the islands of the Archipelago, so as to be at once mistress of the sea, of many fair and fruitful countries, and of part of the great city of Constantinople itself. But ambition, and the desire of lordship it over her neighbours, brought upon her those evils which first produced a decay of trade, and then a declension of power. General histories indeed ascribe this to the league of Cambray, when all the great powers in Europe combined against this republic; and in truth, from that period, the sinking of her power is truly dated; but the Venetian writers very justly observe, that though this effect followed the league, yet there was another more latent, but at the same time a more effectual cause, which was, the falling off of their commerce; and they have ever since been more indebted to their wisdom than their power; to the prudent concealing of their own weakness, and taking advantage of the errors of their enemies, than to any other cause, for their keeping up that part which they still bear, and which had been lost long ago by any other nation but themselves.

At the same time that Venice rose, as it were, out of the sea, another republic was erected on the coast of Italy. There could not well be a worse situation than the narrow, marshy, unprofitable, and unwholesome islands in the Adriatic, except the rocky, barren, and inhospitable shores of Liguria, and yet as commerce raised Venice the Rich on the one, so she erected Genoa the Proud on the other. In spite of ambitious and warlike neighbours, in spite of a confined and unproducing country, and, which were still greater impediments, in spite of perpetual factions and successive revolutions, the trade of Genoa made her rich and great. Her merchants traded to all countries, and threw by carrying the commodities of the one to the other. Her fleets became formidable; and, besides the adjacent island of Corsica, she made larger

and important conquests. She fixed a colony at Caffa, and was for some time in possession of the coasts on both sides of the Black Sea. That emulation which is natural to neighbouring nations, and that jealousy which rises from the pursuit of the same mistress, commerce, begat continual wars between these rival republics; which, after many obstinate and bloody battles, were at last terminated in favour of Venice, by that famous victory of Chiozza gained by her doge Andrew Contarini, from which time Genoa never pretended to be mistress of the sea. These quarrels were fatal to both; but what proved more immediately destructive to the Genoese, was their avarice, which induced them to abandon the fair profits of trade for the sake of that vile method of acquiring wealth by usury.

But we must now look to another part of the world. In the middle age of the German empire, that is, about the middle of the 13th century, there was formed a confederacy of many maritime cities, or at least of cities not far from the sea. This confederacy solely regarded commerce, which they endeavoured to promote and extend, by interesting therein a great number of persons, and endeavouring to profit by their different views and different lights. Though the cities of Germany held the principal rank in the Teutonic Hanse, they did not however forbear associating many other cities, as well in France as in England and in the low countries; the whole, however, without hurting the authority, without prejudice to the rights, of the sovereign on whom they depended. This confederacy had its laws, its ordinances, and its judgments, which were observed with the same respect as the maritime code of the Rhodians, who, passing for the ablest seamen in all antiquity, their constitutions were observed by the Greeks and Romans. The Teutonic Hanse grew in a short time to so high a rank in power and authority by the immense riches it acquired, that princes themselves rendered it a sincere homage from principles of esteem and admiration. Those of the north principally had frequent occasion for their credit, and borrowed of them considerable sums. The grand masters of the Teutonic order, who were at that time sovereigns of Livonia, declared themselves conservators of the rights and privileges of the Hanse: all succeeded, not only to, but beyond their wishes; and Germany, charmed with their progress, looked on them with the same eyes as a curious gardener does on certain rare plants, though not of his own raising and culture. The kings of France and England granted also various privileges to the Teutonic confederacy; they exempted their vessels in case of shipwreck from all demands whatsoever from the admiralty, or from private persons; they forbade any disturbance to their navigation at all times; and even when France was at war with the emperor, or the princes of the north. In fine, during the course of those unhappy wars which were titled *Croisades*, the Hanse was signally consulted, and gave always puissant succours in money and in ships to the Christians oppressed by infidels. It is astonishing, that cities at so great a distance from each other, subject to different kings, sometimes in open war, but always jealous of their rights, should be able to confederate and live to-

gether in so strict a union. But when this union had rendered them very rich and powerful, it cannot seem at all strange, that on the one hand they grew arrogant and overbearing, took upon them not only to treat with sovereigns on the foot of equality, but even to make war with them, and more than once with success. It will, on the other hand, appear still less strange, that such behaviour as this awakened various princes to a more particular view of the dangers that such a league might produce, and the advantages that would naturally flow to their respective states, by recovering their trade thus made over, at least in some part to others, entirely to themselves; and these, in few words, were the causes of the gradual declension of the Hanſatic alliance: which, however, is not totally dissolved at this day; the cities of Lubeck, Hamburgh, and Bremen, maintaining sufficient marks of that splendor and dignity with which this confederacy was once adorned.

We must now turn our eyes to Portugal and Spain, where in the space of about 50 years there happened a train of events which gradually led on to such discoveries as changed the whole face of affairs in the commercial world, and gave to the knowledge of later ages what for some thousand years had been kept secret from all mankind, we mean a perfect and distinct notion of that terraqueous globe which they inhabit. The kingdom of Portugal was small, but well cultivated, very populous, and blessed with a variety of good ports; all which, however, had flood them in little stead, if they had not had a succession of wise princes, who, instead of involving themselves in war with their neighbours to gratify their ambition, endeavoured to extend the happiness and wealth of their subjects, and by so doing their own power, in the softer and more successful method of protecting arts and sciences, encouraging industry, and favouring trade. This, with the convenient situation of their country, in the beginning of the 15th century, prompted some lively spirits to attempt discoveries; and these, countenanced by an heroic young prince, pushed on their endeavours with such success, that step by step the coast of Africa was surveyed as far as the Cape of Good Hope, to which they gave that name. The point they had in view was a new route to the East Indies, which Vasquez de Gama happily discovered; and in a short space of time Portugal, from one of the least considerable, grew to be one of the richest powers in Europe, gained prodigious dominions in Asia and Africa, and raised a naval power superior to any thing that had been seen for many ages before.

But while this was doing, Christopher Columbus, a Genoese of great capacity, though of almost unknown original, who had been bred to the sea from his youth, and who had carefully studied what others made a trade, formed in his mind the amazing project of counteracting experience, and sailing to the Indies by a west course. He offered this project to the Portuguese, by whom it was considered and rejected as a chimera. He proposed it afterwards to other states, but with no better fortune; and at last owed the discovery of the New World to the high spirit of a heroine, the famous Isabella queen of Castile, who almost at her own expence, and with very little coun-

tenance from her husband, who yet was siled *Ferdinand and the Wife*, furnished the adventurous Columbus with that poor Squadron, with which at once, in spite of all the difficulties that the envy of his officers, and the obstinacy of his mutinous crew, threw in his way, perfected his design, and laid open a new Indies, though in reality he aimed at the discovery of the old. Neither was this noble effort of his matchless understanding defeated; for after his decease, Ferdinand Magellan, a Portuguese, proposed to the emperor Charles V. the discovery of a passage to the spice Islands by the South Seas, which was what Columbus aimed at; and though Magellan lived not to return, yet in one voyage the discovery was perfected. It is inconceivable almost how many and how great benefits accrued to Europe from these discoveries; of which, however, it is certain, that the Portuguese made a very indifferent, and the Spaniards much worse, use; the former making slaves of, and the latter rooting out, the natives. This, as it was a most ungrateful return to divine Providence for so high a blessing; so it might have been easily foreseen it would prove, as experience has shewn it did prove, highly prejudicial to their own interests, by depopulating very fine countries, which have been thereby turned into deserts; and though on their first discovery infinite treasures were returned from them, which were coined in the mints of Spain; yet, by an obstinate pursuit of this false policy, the Spanish Islands in the West Indies are now brought so low as to be scarce worth keeping. The consequences that naturally followed on the discovery of a passage by the Cape of Good Hope, and of a fourth part of the globe in the western hemisphere, were, as it has been already hinted, the cause of an entire change in the state of Europe, and produced, not only in Portugal and Spain, but in most other nations, a desire of visiting these remote parts, of establishing colonies, of setting manufactures on foot, of exporting and importing commodities; and of raising, settling, and protecting new manufactures. By this means, as the reader cannot but perceive not only particular nations brought about signal advantages to themselves, but Europe in general received a lasting and invaluable benefit: for its potentates made themselves formidable, and even terrible in those distant parts of the earth, and where their fame had hardly reached before. It is however true, that this has not been carried on as high as it might have been; for though there was room enough for every nation to have had its share, and though it might be demonstrated that the good of the whole would have contributed sufficiently to the profit of every state, the subjects of which had engaged in this traffic; yet, instead of prosecuting so natural and so equitable a measure, they have taken a quite contrary course; and by decrying, attacking, and destroying each other, have very much lessened that prodigious reverence which the Asiatics, Africans, and Americans, at first had for the inhabitants of Europe.

The naval power of the Portuguese received an incurable wound by falling under the power of the Spaniards: and though human policy would have suggested, that this alone must have raised the latter to the monopoly of commerce, and the universal dom-

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nion of the sea; yet the very pursuit of a design so visibly detrimental to the interest of mankind, proved very quickly their ruin also. For the Spaniards, from the natural haughtiness of their temper, misled by the boundless ambition of their princes, and endeavouring to become the lords of Europe, forced other nations in their own defence to make a much quicker progress in navigation than otherways they could have done. For the English and Dutch, who till this time seemed blind to the advantages of their situation, had their eyes opened by the injuries they received; and by degrees the passion of revenge inspired them with designs that possibly public spirit had never excited. In short, the pains taken by Spain to keep all the riches that flowed from these discoveries to herself, and the dangerous, detestable, and destructive purposes to which she applied the immense wealth that flowed in upon her from them, produced effects directly opposite to those which she proposed, and made her enemies rich, great, powerful, and happy, in proportion as her commerce dwindled away, and as her naval power sunk and crumbled to pieces merely by an improper display, an ill-managed exertion, and a wrong application of it.

It was from hence that the inhabitants of the Seven Provinces, whom her oppression had made poor, and her severities driven mad, became first free, then potent, and by degrees rich. Their distresses taught them the necessity of establishing a moderate and equal government; the mildness of that government, and the blessings which it procured to its subjects, raised their number, and elevated their hopes. The consequences became quickly visible, and in a short space of time amazing both to friends and enemies; every fishing village improved into a trading town; their little towns grew up into large and magnificent cities; their inland boroughs were filled with manufactures; and in less than half a century the distressed States of Holland became high and mighty; nay, in spite of the danger and expences which attended a war, made all that time against a superior force, these people, surrounded with enemies, loaded with taxes, exposed to personal service, and to a thousand other disadvantages, grew up to such a strength as not only made the Spaniards despair of reducing them any more under their dominion, but inclined them to wish, and at last forced them to seek, their friendship.

This, at least as far as either ancient or modern histories inform us, was the quickest and strongest of all the productions of commerce that the world has ever seen. For it is out of dispute, that the republic of the United Provinces owes her freedom, her power, and her wealth, to industry and trade intirely. The greatest part of the country is nothing less than fertile; and what is so, produces not enough to suffice the tenth part of its inhabitants for the tenth part of the year: the climate is rather tolerable than wholesome; and its havens are rather advantageous from the difficulty of entering them, than from their commodiousness in any other respect. Native commodities they have few or none; timber and maritime stores are entirely wanting; their country cannot boast so much as of a coal-mine; and yet these provinces, upon which nature has bestowed so little, in

consequence of an extensive trade, are enriched with all things. Their storehouses are full of corn, even when the harvest in corn-countries fails; there is no commodity, how bulky soever, or however scarce and hard to come at, which may not be had from their magazines. The shipping of Holland is prodigious; and to see the quantities of naval stores with which their yards and ports abound, astonishes those who are unacquainted with the vigour of that cause which produces this abundance. But above all, the populousness of this country is the greatest miracle. That men should resort to a Canaan, and desire to live in a land flowing with milk and honey, is nothing strange; but that they should make it their choice to force nature to raise palaces, lay out gardens, dig canals, plant woods, and ransack all the quarters of the earth for fruit and flowers, to produce an artificial paradise in a dead plain, or upon an ingrateful heath in the midst of fogs and standing lakes, would, in so critical an age as this, pass for a fable, if the country did not lie so near us, as to put the truth of it out of question.

§ 2. *British History.*

WE may easily conceive, that foreign commerce by the natives of this island must have been a work of time; for men think first of necessities, then of conveniences, and last of superfluities. Those who came originally from the continent might have better notions of things; but as it must be presumed that either fear or indigence drove them hither, so it is easy to apprehend that succeeding generations must for some time sink much below their ancestors, in their notions of the commodities of life; and, deriving their manners from their circumstances, become quite another sort of people. But those on the opposite continent, knowing that this island was inhabited, and having the use, though in ever so imperfect a degree, of vessels, and of foreign traffic, came over hither, and bartered their goods for the raw commodities of the Britons, till by degrees perhaps they taught the latter to make some improvement in those slight leather and wicker boats, which they used for passing their own rivers, and creeping along their coasts, till at last they ventured themselves over to Gaul, and entered upon some kind of correspondence with their neighbours. All this is so deducible from the laws of nature, that we might have divined thus much by the light of reason, if we had not the commentaries of Cæsar to guide us, and to strengthen by the authority of history the facts that might have been found out by the force of rational conjecture.

Things were precisely in this situation when the Romans invaded Britain; and there is no doubt that our ancestors falling under the power of that empire, and under its power at a time when with respect to arts and sciences it was in a most flourishing condition, was a great advantage to them; and though from their love of civil liberty, which, when under the direction of reason, is the most natural and laudable of all passions, they made a long and vigorous, and in some sense a noble and glorious resistance; yet by degrees they caught the manners and customs of their conquerors, and grew content to be happy rather than free. With learning and politeness the Romans introduced

roduced foreign commerce; and according to the nature of their policy, as they made high roads through the island, established colonies in proper places, and fixed standing camps, which were a kind of fortresses, where they thought proper; so they were no less careful with regard to marts or emporiums for the convenience of traders, and of which what they found is uncertain: but that they left many, is without question; and amongst the rest London, which is not more famous for her present extensive trade, than venerable for her unrecorded antiquity.

When the Romans unwillingly left Britain, and the Britons as unwillingly made way for the Saxons, a new deluge of barbarity overflowed this island: almost all the improvements of our civilized conquerors were defaced; and upon the establishment as it were of a new people, things were all to begin again. This necessarily took up a great deal of time; and before they were in any tolerable posture, the Saxons found themselves distressed by fresh swarms of barbarians. Yet there still remains some evidences of their having been acquainted with, inclined to, and, if their circumstances would have permitted, most certainly would have entered upon and carried foreign commerce to a great height. We have authentic testimonies, that Alfred the Great formed projects of vast discoveries to the North, as he actually sent persons of great prudence and abilities into the East; and the curiosities which they brought home were for many ages preserved in the treasury of the church of Salisbury.

As for the Danes, they were not long our masters: but as they became so by a maritime force, and as their countrymen had established themselves not only on the opposite shore of France, but in other parts of Europe; so it is reasonable to believe that they held some correspondence with them from hence; and that, if their dominion had lasted longer, this might have been better regulated, and productive of many advantages. But they had soon to do with their brethren in another way: for the Normans, men of the same race, but better established in another country, dispossessed them here; and partly under colour of right, partly by force, erected that monarchy, which, not without various alterations and changes, subsists even to our times, and to the subsistence of which, with the help of those changes and alterations, we owe that happy constitution under which we live; that universal improvement which adorn the face of our country; that domestic trade which nourishes so numerous a people, by plentifully rewarding their industry; and that extensive commerce which is at once the source of our wealth and the support of our liberty.

It cannot be expected, that in a work like this, we should attempt to trace the progress of trade through every reign, shew how it was encouraged and protected, or discountenanced and checked; what occasions were luckily seized, or what opportunities unfortunately lost. It may be sufficient for us, after what has been already said, to observe, that the opinion commonly entertained, of our having little or no trade before the reign of queen Elizabeth, is very far from being well founded.

In fact, the reign of that princess was great and

glorious, in whatever light we consider it; but it was most so in this, that, under Providence, it became great and glorious by the wisdom and prudence of the queen and her ministers. The English nation never was in so dilapidate a condition as at her accession. The crown was in debt, the treasury empty, the nation involved in a foreign war directly against her own interests, her coffers naked; in a word, without credit abroad, and without concord at home, no settled religion, the great men split into factions, and the common people distracted and dejected. Sad circumstances these! and yet from hence arose the grandeur of that reign, and the establishment of our commerce. The queen found herself obliged to act with great caution, to derive assistance from every quarter, to employ it faithfully, and to promote to the utmost of her power the welfare of her subjects, whom nothing but the public-spirit of her government could enable to grow rich enough to support the necessary expences of the crown. It was this that gave a popular turn to her councils. She encouraged her subjects to arm against the Spaniards, that they might be accustomed to the sea, and acquire that knowledge in navigation, with which, till then, they had been unacquainted. She passed many laws for the public good, erected several companies, and saw that those companies pursued the ends for which they were erected; in short, she did every thing that could be expected, during the whole course of her reign, to excite and encourage industry at home, and to enable us to make a proper figure abroad. In a word, she furnished us with stock and credit, put us upon improving our commodities and manufactures, brought the art of ship-building amongst us, filled our ports with able seamen, shewed a just respect to English merchants, reduced Ireland so as to render it beneficial to Britain, and approved our sending colonies into America; and thus the seeds of British wealth were sown in her time, though the harvest was reaped in the days of her successors. See the articles COALERY, COLONY, FISHERIES, MANUFACTURES, SHIPPING, and TRADE.

CHAP. II. PRINCIPLES of COMMERCE.

§ i. *Origin of Trade.*

THE most simple of all trade, is that which is carried on by bartering the necessary articles of subsistence. If we suppose the earth free to the first possessor, this person who cultivates it will first draw from it his food, and the surplus will be the object of barter: he will give this in exchange to any one who will supply his other wants. This naturally supposes both a surplus quantity of food produced by labour, and also free hands; for he who makes a trade of agriculture cannot supply himself with all other necessities, as well as food; and he who makes a trade of supplying the farmers with such necessities, in exchange for his surplus of food, cannot be employed in producing that food. The more the necessities of man increase, the more free hands are required to supply them; and the more free hands are required, the more surplus food must be produced by additional labour, to supply their demand.

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This is the least complex kind of trade, and may be carried on to a greater or less extent, in different countries, according to the different degrees of the wants to be supplied. In a country where there is no money, nor any thing equivalent to it, the wants of mankind will be confined to few objects; to wit, the removing the inconveniencies of hunger, thirst, cold, heat, danger, and the like. A free man, who, by his industry, can procure all the comforts of a simple life, will enjoy his rest, and work no more: and, in general, all increase of work will cease, so soon as the demand for the purposes mentioned comes to be satisfied. There is a plain reason for this. When the free hands have procured, by their labour, wherewithal to supply their wants, their ambition is satisfied: so soon as the husbandmen have produced the necessary surplus for relieving theirs, they work no more. Here then is a natural stop put to industry, consequently to bartering.

The next thing to be examined is, how bartering grows into trade, properly so called and understood, according to the definition given of it above; how trade comes to be extended among men; how manufactures, more ornamental than useful, come to be established; and how men come to submit to labour, in order to acquire what is not absolutely necessary for them.

This, in a free society, is chiefly owing to the introduction of money, and a taste for superfluities in those who possess it.

In ancient times, money was not wanting; but the taste for superfluities not being in proportion to it, the specie was locked up. This was the case in Europe four hundred years ago. A new taste for superfluity has drawn, perhaps, more money into circulation, from our own treasures, than from the mines of the new world. The poor opinion we entertain of the riches of our fore-fathers, is founded upon the modern way of estimating wealth, by the quantity of coin in circulation, from which we conclude, that the greatest part of the specie now in our hands must have come from America.

It is more, therefore, through the taste of superfluity, than in consequence of the quantity of coin, that trade comes to be established; and it is only in consequence of trade that we see industry carry things in our days to so high a pitch of refinement and delicacy. Let us illustrate this, by comparing together the different operations of barter, sale, and commerce.

When reciprocal wants are supplied by barter, there is not the smallest occasion for money: this is the most simple of all combinations.

When wants are multiplied, bartering becomes more difficult, upon this money is introduced. This is the common price of all things: it is a proper equivalent in the hands of those who want, perfectly calculated to supply the occasions of those who, by industry, can relieve them. This operation of buying and selling is a little more complex than the former; but still we have here no idea of trade, because we have not introduced the merchant, by whose industry it is carried on.

Let this third person be brought into play, and the

whole operation becomes clear. What before we called *wants*, is here represented by the consumer; what we called *industry*, by the manufacturer; what we called *money*, by the merchant. The merchant here represents the money, by substituting credit in its place; and as the money was invented to facilitate barter, to the merchant, with his credit, is a new refinement upon the use of money. This renders it still more effectual in performing the operations of buying and selling. This operation is trade: it relieves both parties of the whole trouble of transportation, and adjusting wants to wants, or wants to money; the merchant represents by turns both the consumer, the manufacturer, and the money. To the consumer he appears as the whole body of manufacturers; to the manufacturers as the whole body of consumers; and to the one and the other class his credit supplies the use of money. This is sufficient at present for an illustration. We now return to the simple operations of money in the hands of the two contracting parties, the buyer and the seller, in order to show how men come to submit to labour in order to acquire superfluities.

So soon as money is introduced into a country, it becomes an universal object of want to all the inhabitants.

The consequence is, that the free hands of the state, who before slopt working, because all their wants were provided for, having this new object of ambition before their eyes, endeavour, by refinements upon their labour, to remove the smaller inconveniencies which result from a simplicity of manners. People, who formerly knew but one sort of clothing for all seasons, willingly part with a little money to procure for themselves different sorts of apparel properly adapted to summer and winter, which the ingenuity of manufacturers, and their desire of getting money, may have suggested to their invention.

Indeed these refinements seem more generally owing to the industry and invention of the manufacturers, (who by their ingenuity daily contrive means of softening or relieving inconveniencies, which mankind seldom perceive to be such, till the way of removing them is contrived), than to the taste of luxury in the rich, who, to indulge their ease, engage the poor to become industrious.

Let any man make an experiment of this nature upon himself, by entering into the first shop. He will no where so quickly discover his wants as there. Every thing he sees appears either necessary, or at least highly convenient; and he begins to wonder how he could have been so long without that which the ingenuity of the workman alone had invented, in order that from the novelty it might excite his desire; for perhaps when it is bought, he will never once think of it more, nor ever apply it to the use for which it at first appeared so necessary.

Here then is a reason why mankind labour though not in want. They become desirous of possessing the very instruments of luxury, which their avarice or ambition prompted them to invent for the use of others.

What has been said represents trade in its infancy, or rather the materials with which that great fabrick is built.

We have formed an idea of the wants of mankind multiplied even to luxury, and abundantly supplied by the employment of all the free hands set apart for that purpose. But if we suppose the workman himself disposing of his work, and purchasing with it food from the farmer, cloaths from the clothier; and, in general, seeking for the supply of every want from the hands of the person directly employed for the purpose of relieving it; this will not convey an idea of trade according to our definition.

Trade and commerce are an abbreviation of this long process; a scheme invented and set on foot by merchants, from a principle of gain, supported and extended among men, from a principle of general utility to every individual, rich or poor, to every society, great or small.

Instead of a pin-maker exchanging his pins with 50 different persons, for whose labour he has occasion, he sells all to the merchant for money or for credit; and, as occasion offers, he purchases all his wants, either directly from those who supply them, or from other merchants who deal with manufacturers in the same way his merchant dealt with him.

Another advantage of trade is, that industrious people in one part of the country, may supply customers in another, though distant. They may establish themselves in the most commodious places for their respective business, and help one another reciprocally, without making the distant parts of the country suffer for want of their labour. They are likewise exposed to no avocation from their work, by seeking for customers.

Trade produces many excellent advantages; it marks out to the manufacturers when their branch is under or over-stocked with hands. If it is understocked, they will find more demand than they can answer; if it is overstocked, the sale will be slow.

Intelligent men, in every profession, will easily discover when these appearances are accidental, and when they proceed from the real principles of trade.

Posts, and correspondence by letters, are a consequence of trade; by the means of which merchants are regularly informed of every augmentation or diminution of industry in every branch, in every part of the country. From this knowledge they regulate the prices they offer; and as they are many, they serve as a check upon one another, from the principles of competition.

From the current prices, the manufacturers are as well informed, as if they kept the correspondence themselves: the statesman feels perfectly where hands are wanting, and young people destined to industry, obey, in a manner, the call of the public, and fall naturally in to supply the demand.

Two great assistances to merchants, especially in the infancy of trade, are public markets for collecting the work of small dealers, and large undertakings in the manufacturing way by private hands. By these means the merchants come at the knowledge of the quantity of work in the market, as on the other hand the manufacturers learn, by the sale of the goods, the extent of the demand for them. These two things being justly known, the price of goods is easily fixed.

Public sales serve to correct the small inconveni-

encies which proceed from the operations of trade. A set of manufacturers got all together into one town, and entirely taken up with their industry, are thereby as well informed of the rate of the market as if every one of them carried thither his work, and upon the arrival of the merchant, who readily takes it off their hands, he has not the least advantage over them from his knowledge of the state of demand. This man both buys and sells in what is called *wholesale*; and from him retailers purchase, who distribute the goods to every consumer throughout the country. These last buy from wholesale merchants in every branch, that proportion of every kind of merchandize which is suitable to the demand of their borough, city, or province.

Thus all inconveniences are prevented, at some additional cost to the consumer, who must naturally reimburse the whole expence. The distance of the manufacturer, the obscurity of his dwelling, the caprice in selling his work, are quite removed; the retailer has all in his shop, and the public buys at a current price.

§ ii. *How the prices of Goods are determined by Trade.*

In the price of goods, two things must be considered as really existing, and quite different from one another; to wit, the real value of the commodity, and the profit upon alienation.

I. The first thing to be known of any manufacture, when it comes to be sold, is, how much of it a person can perform in a day, a week, a month, according to the nature of the work, which may require more or less time to bring it to perfection. In making such estimates, regard is to be had only to what, upon an average, a workman of the country in general may perform, without supposing him the best or the worst in his profession, or having any peculiar advantage or disadvantage as to the place where he works.

Hence the reason why some people thrive by their industry, and others not; why some manufactures flourish in one place, and not in another.

II. The second thing to be known, is the value of the workman's subsistence, and necessary expence, both for supplying his personal wants, and providing the instruments belonging to his profession, which must be taken upon an average as above; except when the nature of the work requires the presence of the workman in the place of consumption: for although some trades, and almost every manufacture, may be carried on in places at a distance, and therefore may fall under one general regulation as to prices; yet others there are, which, by their nature, require the presence of the workman in the place of consumption; and in that case the prices must be regulated by circumstances relative to every particular place.

III. The third and last thing to be known, is the value of the materials, that is, the first matter employed by the workman; and if the object of his industry be the manufacture of another, the same process of inquiry must be gone through with regard to the first, as with regard to the second: and thus the most complex manufactures may be at last reduced to the greatest simplicity.

These three articles being known, the price of manufacture

facture is determined. It cannot be lower than the amount of all the three, that is, than the real value; whatever it is higher, is the manufacturer's profit. This will ever be in proportion to demand, and therefore will fluctuate according to circumstances.

Hence appears the necessity of a great demand, in order to promote flourishing manufactures.

By the extensive dealings of merchants, and their constant application to the study of the balance of work and demand, all the above circumstances are known to them, and are made known to the industrious, who regulate their living and expence according to their certain profit.

Employ a workman in a country where there is little trade or industry, he proportions his price always to the urgency of your want, or your capacity to pay; but seldom to his own labour. Employ another in a country of trade, he will not impose upon you, unless perhaps you be a stranger, which supposes your being ignorant of the value; but employ the same workman in a work not usual in the country, consequently not demanded, consequently not regulated as to the value, he will proportion his price as in the first supposition.

We may therefore conclude, from what has been said, that in a country where trade has been established, manufactures must flourish, from the ready sale, the regulated price of work, and the certain profit resulting from industry. Let us next inquire into the consequences of such a situation.

§ iii. *How foreign Trade opens to an industrious People and the Consequences of it to the Merchants who set it on foot.*

THE first consequence of the situation described in the preceding section is, that wants are easily supplied, for the adequate value of the thing wanted.

The next consequence is, the opening of foreign trade, under its two denominations of passive and active. Strangers and people of distant countries, finding the difficulty of having their wants supplied at home, and the ease of having them supplied from this country, immediately have recourse to it. This is passive trade. The active is when merchants, who have executed this plan at home with success, begin to transport the labour of their countrymen into other regions, which either produce, or are capable of producing such articles of consumption, proper to be manufactured, as are most demanded at home; and consequently will meet with the readiest sale, and fetch the largest profits.

Hence then is the opening of foreign trade, under its two denominations of active and passive.

What then are the consequences of this new commerce to our merchants, who have left their homes in quest of gain abroad?

The first is, that, arriving in any new country, they find themselves in the same situation, with regard to the inhabitants, as the workman in the country of no trade, with regard to those who employ him; that is, they proportion the price of their goods to the eagerness of acquiring, or the capacity of paying, in the inhabitants, but never to their real value.

The first profits then, upon this trade, must be very considerable; and the demand from such a country

will be *high or low, great or small*, according to the spirit, not the real wants of the people: for these in all countries must first be supplied by the inhabitants themselves, before they cease to labour.

If the people of this not-trading country be abundantly furnished with commodities useful to the traders, they will easily part with them, at first, for the instruments of luxury and ease; but the great profit of the traders will insensibly increase the demand for the productions of their new correspondents; this will have the effect of producing a competition between themselves, and thereby of throwing the demand on their side. This is perpetually a disadvantage in traffic: the most unpolished nations in the world quickly perceive the effects of it; and are taught to profit by the discovery, in spite of the address of those who are the most expert in commerce.

The traders will therefore be very fond of falling upon every method and contrivance to inspire this people with a taste of refinement and delicacy. Abundance of fine presents, consisting of every instrument of luxury and superfluity, the best adapted to the genius of the people, will be given to the prince and leading men among them. Workmen will even be employed at home, to study the taste of the strangers, and to captivate their desires by every possible means. The more eager they are of presents, the more lavish the traders will be in bestowing and diversifying them. It is an animal put up to fatten, the more he eats the sooner he is fit for slaughter. When their taste for superfluity is fully formed, when the relish for their former simplicity is sophisticated, poisoned, and obliterated, then they are surely in the fetters of the traders, and the deeper they go, the less possibility there is of their getting out. The presents then will die away, having served their purpose; and if afterwards they are found to be continued, it will probably be to support the competition against other nations, who will incline to share of the profits.

If, on the contrary, this not-trading nation does not abound with commodities useful to the traders, these will make little account of trading with them, whatever their turn may be; but, if we suppose this country inhabited by a laborious people, who, having taken a taste for refinement from the traders, apply themselves to agriculture, in order to produce articles of subsistence, they will solicit the merchants to give them part of their manufactures in exchange for those; and this trade will undoubtedly have the effect of multiplying numbers in the trading nation. But if food cannot be furnished, nor any other branch of production found out to support the correspondence, the taste for refinement will soon die away, and trade will stop in this quarter.

Had it not been for the furs in those countries adjacent to Hudson's Bay, and in Canada, the Europeans never would have thought of supplying instruments of luxury to those nations; and if the inhabitants of those regions had not taken a taste for the instruments of luxury, furnished to them by the Europeans, they never would have become so indefatigable nor so dextrous hunters. At the same time we are not to suppose, that ever these Americans would have come to Europe in quest of our manufactures. It is, therefore, owing

to our merchants, that these nations are become in any degree fond of refinement ; and this taste, in all probability, will not soon exceed the proportion of the productions of their country. From these beginnings of foreign trade it is easy to trace its increase.

One step towards this, is the establishing correspondences in foreign countries ; and these are more or less necessary in proportion as the country where they are established is more or less polished or acquainted with trade. They supply the want of posts, and point out to the merchants what proportion the productions of the country bear to the demand of the inhabitants for manufactures. This communicates an idea of commerce to the not-trading nation, and they insensibly begin to fix a determined value upon their own productions, which perhaps bore no determined value at all before.

Let us trace a little the progress of this refinement in the savages, in order to show how it has the effect of throwing the demand upon the traders, and of creating a competition among them, for the productions of the new country.

Experience shews, that, in a new discovered country, merchants constantly find some article or other of its productions, which turns out to a great account in commerce ; and we see that the longer such a trade subsists, and the more the inhabitants take a taste for European manufactures, the more their own productions rise in their value, and the less profit is made by trading with them, even in cases where the trade is carried on by companies ; which is a very wise institution for one reason, that it cuts off a competition between our merchants.

This is the best means of keeping prices low in favour of the nation ; however it may work a contrary effect with respect to individuals who must buy from these monopolies.

When companies are not established, and when trade is open, our merchants, by their eagerness to profit by the new trade, betray the secrets of it, they enter into competition for the purchase of the foreign produce, and this raises prices, and favours the commerce of the most ignorant savages.

§ iv. *Consequences of the Introduction of a passive foreign Trade among a People who live in simplicity and Idleness.*

We now suppose the arrival of traders, all in one interest, with instruments of luxury and refinement, at a port in a country of great simplicity of manners, abundantly provided by nature with great advantages for commerce, and peopled by a nation capable of adopting a taste for superfluities.

The first thing the merchants do is, to expose their goods, and point out the advantages of many things, either agreeable or useful to mankind in general, such as wines, spirits, instruments of agriculture, arms, and ammunition for hunting, nets for fishing, manufactures for cloathing, and the like. The advantages of these are presently perceived, and such commodities are eagerly sought after.

The natives on their side, produce what they most esteem, generally something superfluous or ornamental. The traders after examining all circumstances,

determine the object of their demand, giving the least quantity possible in return for this superfluity, in order to impress the inhabitants with a high notion of the value of their own commodities ; but as this parsimony may do more hurt than good to their interest, they are very generous in making presents, from the principles mentioned above.

When the exchange is completed, and the traders depart, regret is commonly mutual ; the one and the other are sorry that the superfluities of the country fall short. A return is promised by the traders, and assurances are given by the natives of a better provision another time.

What are the first consequences of this revolution ?

It is evident, that, in order to supply an equivalent for this new want, more hands must be set to work than formerly. And it is evident also, that this augmentation of industry will not essentially increase numbers : Why ? Because the produce of the industry is, in this case, intended to be exported. But, if we can find out any additional consumption at home, even implied by this new trade, it will have the effect of augmenting numbers. An example will make this plain.

Let us suppose the superfluity of this country to be the skins of wild beasts, not proper for food ; the manufacture sought for, brandy. The brandy is sold for furs. He who has furs, or he who can spare time to hunt for them, will drink brandy in proportion : but there is no reason to conclude from this simple operation, that one man more in the country must necessarily be fed, or that any augmentation of agriculture must of consequence ensue from this new traffic.

But let us throw in a circumstance which may apply an additional consumption at home, and then examine the consequences.

A poor creature who has no equivalent to offer for food, who is miserable, and ready to perish for want of subsistence, goes a hunting, and kills a wolf ; he comes to a farmer with the skin, and says. You are well fed, but you have no brandy ; if you will give me a loaf, I will give you this skin, which the strangers are so fond of, and they will give you brandy. But, says the farmer, I have no more bread than what is sufficient for my own family. As for that, replies the other, I will come and dig in your ground, and you and I will settle our account as to the small-quantity I desire of you. The bargain is made ; the poor fellow gets his loaf, and lives at least ; perhaps he marries, and the farmer gets a dram. But had it not been for this dram, that is, this new want, which was purchased by the industry of this poor fellow, by what argument could he have induced the farmer to part with a loaf ?

Here the sentiment of charity is excluded. This alone is a principle of multiplication ; but as true it is, on the other hand, that could the poor fellow have got bread by begging, he would not probably have gone a hunting.

Here then it appears, that the very dawning of trade, in the most unpolished countries, implies a multiplication. This is enough to point out the first step, and to connect the subject of our present inquiries with what has been already discussed in relation to other circumstances.

So soon as all the furs are disposed of, and a taste for superfluity is introduced, both the traders and the natives will be equally interested in the advancement of industry in this country. Many new objects of profit for the first will be discovered, which the proper employment of the inhabitants, in reaping the natural advantages of their soil and climate, will make effectual. The traders will therefore endeavour to set on foot many branches of industry among the savages, and the allurements of brandy, arms, and clothing, will animate these in the pursuit of them.

When once this revolution is brought about; when those who formerly lived in simplicity become industrious; and manners put on a new face.

That is to say, we now find two trading nations instead of one, with this difference, however, that as hitherto we have supposed the merchants all in one interest, the compound demand, that is, the competition of the buyers, has been, and must still continue on the side of the natives. This is a great prejudice to their interest; but as it is not supposed sufficient to check their industry, nor to restrain their consumption of the manufactures, let us here examine a little more particularly the consequences of the principle of demand in such a situation; for although we allow, that it can never change sides, yet it may admit of different modifications, and produce different effects, as we shall presently perceive.

The merchants we suppose all in one interest, consequently there can be no competition among them; consequently no check can be put upon their raising their prices, as long as the prices they demand are complied with. So soon as they are raised to the full extent of the abilities of the natives, or of their inclination to buy, the merchants have the choice of three things, which are all perfectly in their option; and the preference to be given to the one or the other, depends entirely upon themselves, and upon the circumstances we are going to point out.

First, they may support their *high* demand; that is, not lower their price; which will preserve a high estimation of the manufactures in the opinion of the inhabitants, and render the profits upon their trade the greatest possible. This part they may possibly take, if they perceive the natives doubling their diligence, in order to become able, in time, to purchase considerable cargoes at a high value; from which supposition is implied a strong disposition in the people to become luxurious, since nothing but want of ability prevents them from complying with the highest demand: but still another circumstance must concur, to engage the merchants not to lower their price. The great proportion of the goods they seek for in return, must be found in the hands of a few. This will be the case if slavery be established; for then there must be many poor and few rich: and they are commonly the rich consumers who proportion the price they offer, rather to their desires, than to the value of the thing.

The second thing which may be done is, to open the door to a *great* demand; that is, to lower their prices. This will sink the value of the manufactures in the opinion of the inhabitants, and render profits less in proportion, although indeed, upon the voyage, the profits may be greater.

This part they will take, if they perceive the inhabitants do not incline to consume great quantities of the merchandize at a high value, either for want of abilities or inclination; and also, if the profits upon the trade depend upon a large consumption, as is the case in merchandize of a low value, and suited chiefly to the occasions of the lower sort. Such motives of expediency will be sufficient to make them neglect a high demand, and prefer a great one; and the more, when there is a likelihood that the consumption of low priced goods in the beginning may beget a taste for others of a higher value, and thus extend in general the taste of superfluity.

A third part to be taken, is the least politic, and perhaps the most familiar. It is to profit by the competition between the buyers, and encourage the rising of demand as long as possible; when this comes to a stop, to make a kind of auction, by first bringing down the prices to the level of the highest bidders, and so to descend by degrees, in proportion as demand sinks. Thus we may say with propriety, that demand commonly becomes great, in proportion as prices sink. By this operation, the traders will profit as much as possible, and sell off as much of their goods as the profits will permit.

But this plan, in a new discovered country, is not politic, as it both discovers a covetousness and a want of faith in the merchants, and also throws open the secrets of their trade to those who ought to be kept ignorant of them.

Let us next suppose, that the large profits of our merchants shall be discovered by others, who arrive at the same ports in a separate interest, and who enter into no combination which might prevent the natural effects of competition.

Let the state of demand among the natives be supposed the same as formerly, both as to height and greatness, in consequence of the operation of the different principles, which might have induced our merchants to follow one or other of the plans we have been describing; we must however still suppose, that they have been careful to preserve considerable profits upon every branch.

If we suppose the inhabitants to have increased in numbers, wealth, and taste for superfluity, since the last voyage, demand will be found rather on the rising hand. Upon the arrival of the merchants in competition with the former, both will offer to sale: but if both stand to the same prices, it is very natural to suppose, that the former dealers will obtain a preference; as, *ceteris paribus*, it is always an advantage to know and to be known. The last comers, therefore, have no other way left to counter-balance this advantage, but to lower their prices.

This is a new phenomenon: here the fall of prices is not voluntary as formerly; nor consented to from expediency; nor owing to a failure of demand, but to the influence of a new principle of commerce, to wit, a double competition, which we shall now examine.

§ v. Of double Competition.

WHEN competition is much stronger on one side of the contract than on the other, it is called *simple*.

This is the species of competition which is implied in the term *high demand*, or when it is said that *demand raises prices*.

Double competition is, when, in a certain degree, it takes place on both sides of the contract at once, or vibrates alternately from one to the other. This is what restrains prices to the adequate value of merchandize.

The great difficulty is to distinguish clearly between the principles of *demand*, and those of *competition*: here then follows the principal differences between the two, relatively to the effects they produce severally in the mercantile contract of buying and selling, which we here express shortly by the word *contract*.

Simple demand is what brings the quantity of a commodity to market. Many demand, who do not buy; many offer, who do not sell. This demand is called *great* or *small*; it is said to increase, to augment, to swell; and is expressed by these and other synonymous terms, which mark an augmentation or diminution of quantity. In this species, two people never demand the same thing, but a part of the same thing, or things quite alike.

Compound demand is the principle which raises prices, and can never make them sink; because in this case more than one demands the very same thing. It is solely applicable to the buyers, in relation to the price they offer. This demand is called *high* or *low*, and is said to rise, to fall, to mount, to sink, and is expressed by these and other synonymous terms.

Simple competition, when between buyers, is the same as *compound* or *high demand*; but differs from it in so far, as this may equally take place among sellers, which compound demand cannot; and then it works a contrary effect: it makes prices sink, and is synonymous with *low demand*: it is this competition which overturns the balance of work and demand.

Double competition is what is understood to take place in almost every operation of trade; it is this which prevents their excessive rise of prices; it is this which prevents their excessive fall. While double competition prevails, the balance is perfect, trade and industry flourish.

The capital distinction, therefore, between the terms *demand* and *competition* is, that *demand* is constantly relative to the buyers; and when money is not the price, as in barter, then it is relative to that side upon which the greatest *competition* is found.

We therefore say, with regard to *prices*, demand is *high* or *low*. With regard to the *quantity of merchandize*, demand is *great* or *small*. With regard to *competition*, it is always called *great* or *small*, *strong* or *weak*.

Competition is, with equal propriety, applicable to both parties in the contract. A *competition* among buyers is a proper expression; a *competition* among sellers, who have the merchandize, is fully as easily understood, though it be not quite so striking, for reasons which an example will make plain.

You come to a fair, where you find a great variety of every kind of merchandize, in the possession of different merchants. These, by offering their goods to sale, constitute a tacit competition; every one of them wishes to sell in preference to another, and at the same time with the best advantage to himself.

The buyer begins, by cheapening at every shop. The first price asked marks the covetousness of the seller; the first price offered, the avarice of the buyer. From this operation competition begins to work its effects on both sides, and so becomes double. The principles which influence this operation are now to be deduced.

It is impossible to suppose the same degree of eagerness, either to buy or to sell, among several merchants; because the degree of eagerness is exactly in proportion to their view of profit; and as these must necessarily be influenced and regulated by different circumstances, that buyer, who has the best prospect of selling again with profit, obliges him, whose prospect is not so good, to content himself with less; and that seller, who has bought to the best advantage, obliges him, who has paid dearer for the merchandize, to moderate his desire of gain.

It is from these principles, that competition among buyers and sellers must take place. This is what confines the fluctuation of prices within limits which are compatible with the reasonable profits of both buyers and sellers; for we must constantly suppose the whole operation of buying and selling to be performed by merchants; the buyer cannot be supposed to give so high a price as that which he expects to receive, when he distributes to the consumers, nor can the seller be supposed to accept of a lower than that which he paid to the manufacturer. This competition is properly called *double*, because of the difficulty to determine upon which side it stands; the same merchant may have it in his favour upon certain articles, and against him upon others; it is continually in vibration, and the arrival of every post may less or more pull down the heavy scale.

In every transaction between merchants, the profit resulting from the sale must be exactly distinguished from the value of the merchandize. The first may vary, the last never can. It is this profit alone which can be influenced by competition; and it is for that reason we find such uniformity every where in the prices of goods of the same quality.

The competition between sellers does not appear so striking as that between buyers; because he who offers to sale, appears only passive in the first operation; whereas the buyers present themselves one after another; they make a demand when the merchandize is refused to one at a certain price, a second either offers more, or does not offer all: but so soon as another seller finds his account in accepting the price the first had refused, then the first enters into competition, providing his profits will admit his lowering the first price, and thus competition takes place among the sellers, until the profits upon their trade prevent prices from falling lower.

In all markets this competition is varying, though insensibly, on many occasions; but in others the vibrations are very perceptible. Sometimes it is found strongest on the side of the buyers; and in proportion as this grows, the competition between the sellers diminishes. When the competition between the former has raised prices to a certain standard, it comes to a stop; then the competition changes sides, and takes place among the sellers, eager to profit of the highest price. This makes prices fall, and according as they fall,

fall, the competition among the buyers diminishes. They still wait for the lowest period. At last it comes; and then perhaps some new circumstance, by giving the balance a kick, disappoints their hopes. If therefore it ever happens, that there is but one interest upon one side of the contract, as in the example in the former section, where we supposed the sellers united, you perceive, that the rise of the price, occasioned by the competition of the buyers, and even its coming to a stop, could not possibly have the effect of producing any competition on the other side; and therefore, if prices come afterwards to sink, the fall must have proceeded from the prudential considerations of adapting the price to the faculties of those who, from the height of it, had withdrawn their demand.

From these principles of competition, the forestalling of markets is made a crime, because it diminishes the competition which ought to take place between different people, who have the same merchandize to offer to sale. The forestaller buys up all, with an intention to sell with more profit, as he has by that means taken other competitors out of the way, and appears with a single interest on one side of the contract, in the face of many competitors on the other. This person is punished by the state, because he has prevented the price of the merchandize from becoming justly proportioned to the real value; he has robbed the public, and enriched himself; and in the punishment he makes restitution. Here occur two questions to be resolved, for the sake of illustration.

Can competition among buyers possibly take place, when the provision made is more than sufficient to supply the quantity demanded? On the other hand, can competition take place among the sellers, when the quantity demanded exceeds the total provision made for it?

We think it may in both cases; because in the one and the other, there is a competition implied on one side of the contract, and the very nature of this competition implies a possibility of its coming on the other, provided separate interests be found upon both sides. But to be more particular:

1. Experience shews, that however justly the proportion between the demand and the supply may be determined in fact, it is still next to impossible to discover it exactly, and therefore the buyers can only regulate the prices they offer, by what they may reasonably expect to sell for again. The sellers, on the other hand, can only regulate the prices they expect, by what the merchandize has cost them when brought to market. We have already shewn, how, under such circumstances, the several interests of individuals affect each other, and make the balance vibrate.

2. The proportion between the supply and the demand is seldom other than *relative* among merchants, who are supposed to buy and sell, not from necessity, but from a view to profit. What we mean by *relative* is, that their demand is *great* or *small*, according to prices; there may be a great demand for grain at 35 s. *per* quarter, and no demand at all for it at 40 s.; that is, among merchants.

It is essential to attend to the smallest circumstance in matters of this kind. The circumstance we mean, is the difference we find in the effect of competition,

when it takes place purely among merchants on both sides of the contract, and when it happens, that either the consumers mingle themselves with the merchant-buyers or the manufacturers, that is, the furnishers, mingle themselves with the merchant-sellers. This combination we shall illustrate by the solution of another question, and then conclude with a few reflections upon the whole.

Can there be no case formed, where the competition upon one side may subsist, without a possibility of its taking place on the other, although there should be separate interests upon both?

The case is hardly supposable among merchants, who buy and sell with a view to profit; but it is absolutely supposable, and that is all, when the direct consumers are the buyers; when the circumstances of one of the parties is perfectly known; and when the competition is so strong upon one side, as to prevent a possibility of its becoming double, before the whole provision is sold off, or the demand satisfied. Let us have recourse to examples.

Grain arriving in a small quantity, at a port where the inhabitants are starving, produces so great a competition among the consumers, who are the buyers, that their necessity becomes evident; all the grain is generally bought up before prices can rise so high as to come to a stop; because nothing but want of money, that is, an impossibility of complying with the prices demanded by the merchants, can restrain them: but if you suppose, even here, that prices come naturally to a stop; or that, after some time, they fall lower, from prudential considerations; then there is a possibility of a competition taking place among the sellers, from the principles above deduced. If, on the contrary, the stop is not natural, but occasioned by the interposition of the magistrate, from humanity, or the like, there will be no competition, because then the principles of commerce are suspended; the sellers are restrained on one side, and they restrain the buyers on the other. Or rather indeed, it is the magistrate, or compassion, who in a manner fixes the price, and performs the office of both buyer and seller.

A better example still may be found, in a competition among sellers; where it may be so strong as to render a commodity in a manner of no value at all, as in the case of an uncommon and unexpected draught of fish, in a place of small consumption, when no preparations have been made for salting them. There can be then no competition among the buyers; because the market cannot last, and they find themselves entirely masters, to give what price they please, being sure the sellers must accept of it, or lose their merchandize. In the first example, humanity commonly stops the activity of the principle of competition; in the other, it is stopped by a certain degree of fair dealing, which forbids the accepting of a merchandize for nothing.

In proportion therefore as the rising of prices can stop demand, or the sinking of prices can increase it, in the same proportion will competition prevent either the rise or the fall from being carried beyond a certain length: and if such a case can be put, where the rising of prices cannot stop demand, nor the lowering of prices augment it, in such cases double competition has

no effect; because these circumstances unite the most separate interests of buyers and sellers in the mercantile contract; and when upon one side there is no separate interest, there can then be no competition.

From what has been said, we may form a judgment of the various degrees of competition. A book not worth a shilling, a fish of a few pounds weight, are often sold for considerable sums. The buyers here are not merchants. When an ambassador leaves a court in a hurry, things are sold for less than the half of their value: he is no merchant, and his situation is known. When, at a public market, there are found consumers, who make their provision; or manufacturers, who dispose of their goods for present subsistence; the merchants, who are respectively upon the opposite side of the contract to these, profit of their competition; and those who are respectively upon the same side with them, stand by with patience until they have finished their business. Then matters come to be carried on between merchant and merchant, and then profits may rise and fall, in the proportion of quantity to demand; that is to say, if the provision is less than the demand, the competition among the demanders, or the rise of the price, will be in the compound proportion of the falling short of the commodity, and of the prospect of selling again with profit. It is this combination which regulates the competition, and keeps it within bounds. It can affect but the profits upon the transaction: the intrinsic value of the commodity stands immovable: nothing is ever sold below the real value; nothing is ever bought for more than it may probably bring. We mean in general. Whereas, so soon as consumers and needy manufacturers mingle in the operation, all proportion is lost. The competition between them is too strong for the merchants; the balance vibrates by jerks. In such markets merchants seldom appear: the principal objects there, are the fruits and productions of the earth, and articles of the first necessity for life, not manufactures strictly so called. A poor fellow often sells to purchase bread to eat; not to pay what he did eat while he was employed in the work he disposes of. The consumer often measures the value of what he is about to purchase, by the weight of his purse, and his desire to consume.

§ vi. Of what is called *Expense, Profit, and Loss*.

The term *expense*, when simply expressed, without any particular relation, is always understood to be relative to money. This kind is distinguished under the three heads of *private, public, and national*.

1. *Private expense* is, what a private person, or private society, lays out, either to provide articles of consumption, or something more permanent, which may be conducive to their ease, convenience, or advantage. Thus we say, a *large domestic expense*, relative to one who spends a great income. We say, a merchant has been at *great expense* for magazines, for living, for clerks, &c. but never that he has been at any in buying goods. In the same way a manufacturer may expend for building, machines, horses, and carriages, but never for the matter he manufactures. When a thing is bought, in order to be sold again, the sum employ-

ed is called money *advanced*; when it is bought not to be sold, it may be said to be *expended*.

2. *Public expense* is, the employment of that money, which has been contributed by individuals, for the current service of the state. The contribution, or gathering it together, represents the effects of many articles of *private expense*; the laying it out when collected, is *public expense*.

3. *National expense*, is what is expended out of the country; this is what diminishes national wealth. The principal distinction to be here attended to, is between public expense, or the laying out of public money, and national expense, which is the alienating the nation's wealth in favour of strangers. Thus the greatest public expense imaginable, may be no national expense; because the money may remain at home. On the other hand, the smallest public, or even private expense, may be a national expense; because the money may go abroad.

Profit and loss, is divided into *positive, relative, and compound*. *Positive profit* implies no loss to any body; it results from an augmentation of labour, industry, or ingenuity, and has the effect of swelling or augmenting the public good.

Positive loss, implies no profit to any body; it is what results from the cessation of the former, or of the effects resulting from it, and may be said to diminish the public good.

Relative profit, is what implies a loss to some body; it marks a vibration of the balance of wealth between parties, but implies no-addition to the general stock.

Relative loss, is what, on the contrary, implies a profit to some body; it also marks a vibration of the balance, but takes nothing from the general stock.

The *compound* is easily understood; it is that species of profit and loss which is partly relative, and partly positive.

§ vii. The general consequences resulting to a trading Nation, upon the opening of an active foreign Commerce.

A nation which remains passive in her commerce, is at the mercy of those who are active, and must be greatly favoured, indeed, by natural advantages, or by a constant flux of gold and silver from her mines, to be able to support a correspondence, not entirely hurtful to the augmentation of her wealth.

When we look upon the wide field which here opens to our view, we are perplexed with too great a variety of objects. In one part, we see a decent and comely beginning of industry; wealth flowing gently in, to recompense ingenuity; numbers both augmenting, and every one becoming daily more useful to another; agriculture proportionally extending itself; no violent revolutions; no exorbitant profits; no insolence among the rich; no excessive misery among the poor; multitudes employed in producing; great economy upon consumption; and all the instruments of luxury, daily produced by the hands of the diligent, going out of the country for the service of strangers; not remaining at home for the gratification of sensuality. At last the augmentations come insensibly to a stop. Then these rivers of wealth, which were in brisk circulation through the whole world, and which returned

returned to this trading nation as blood returns to the heart, only to be thrown out again by new pulsations, begin to be obstructed in their course; and flowing abroad more slowly than before, come to form stagnations at home. Thieft, impatient of restraint, soon burst out into domestic circulation. Upon this cities swell in magnificence of buildings; the face of the country is adorned with palaces, and becomes covered with groves; luxury shines triumphant in every part; inequality becomes more striking to the eye; and want and misery appear more deformed, from the contrast: even fortune grows more whimsical in her inconsistency; the beggar of the other day, now rides in his coach; and he who was born in a bed of state, is seen to die in a goal, or in an almshouse. Such are the effects of great domestic circulation.

The statesman looks about with amazement; he who was wont to consider himself as the first man in the society in every respect, perceives himself, perhaps, eclipsed by the lustre of private wealth, which avoids his grasp when he attempts to seize it. This makes his government more complex and more difficult to be carried on; he must now avail himself of art and address, as well as of power and force. By the help of cajoling and intrigues, he gets a little into debt; this lays a foundation for public credit, which, growing by degrees, and in its progress assuming many new forms, becomes, from the most tender beginnings, a most formidable monster, striking terror into those who cherished it in its infancy. Upon this, as upon a triumphant war-horse, the statesman gets astride; he then appears formidable a-new; his head turns giddy; he is choaked with the dust he has raised; and at the moment he is ready to fall, to his utter astonishment and surprise, he finds a strong monied interest, of his own creating, which, instead of swallowing him up as he apprehended, flies to his support. Through this he gets the better of all opposition, he establishes taxes, multiplies them, mortgages his fund of subsistence; either becomes a bankrupt, and rises again from his ashes; or if he be less audacious, he stands trembling and tottering for a while on the brink of the political precipice. From one or the other of these perilous situations, he begins to discover an endless path, which, after a multitude of windings, still returns into itself, and continues an equal course through this vast labyrinth.

It is now full time to leave off rhapsody, and return to reasoning and cool enquiry, concerning the more immediate and more general effects and revolutions produced by the opening of a foreign trade in a nation of industry.

The first and most sensible alteration will be an increase of demand for manufacturers, because by supplying the wants of strangers, the number of consumers will now be considerably augmented. What again will follow upon this, must depend upon circumstances.

If this revolution in the state of demand should prove too violent, the consequence of it will be to raise demand; if it should prove gradual, it will increase it. This distinction is well understood, and the consequence appears just: for, if the supply do not increase in proportion to the demand, a competition

will ensue among the demanders; which is the common effect of such sudden revolutions. If, on the other hand, a gentle increase of demand should be accompanied with a proportional supply, the whole industrious society will grow in vigour, and in wholesome stature, without being sensible of any great advantage or inconvenience; the change of their circumstances will even be imperceptible.

The immediate effects of the violent revolution will, in this example, be flattering to some, and disagreeable to others. Wealth will be found daily to augment, from the rising of prices, in many branches of industry. This will encourage the industrious classes, and the idle consumers at home will complain. We have already dwelt abundantly long upon the effect resulting from this to the lower classes of the people, in providing them with a certain means of subsistence. Let us now examine in what respect even the higher classes will be made likewise to feel the good effects of this general change, although at first they may suffer a temporary inconvenience from it.

Farmers, as has been observed, will have a greater difficulty in finding servants, who, instead of labouring the ground, will chuse to turn themselves to manufactures. This we have considered in the light of purging the lands of superfluous mouths; but every consequence in this great chain of politics draws other consequences after it, and as they follow one another, things put on different faces, which affect classes differently. The purging of the land is but one of the first; here follows another.

The desertion of the lands employed in a trifling agriculture will at first, no doubt, embarrass the farmers; but in a little time every thing becomes balanced in a trading nation, because here every industrious man must advance in prosperity, in spite of all general combinations of circumstances.

In the case before us, the relative profits upon farming must soon become greater than formerly, because of this additional expence which must affect the whole class of farmers; consequently, this additional expence, instead of turning out to be a loss to either landlord or farmer, will, after some little time, turn out to the advantage of both: because the produce of the ground, being indispensably necessary to every body, must in every article increase in its value. Thus in a short time accounts will be nearly balanced on all hands; that is to say, the same proportion of wealth will, *ceteris paribus*, continue the same among the industrious. We say among the industrious; for those who are either idle, or even negligent, will be great losers.

A proprietor of land, inattentive to the causes of his farmer's additional expence, may very imprudently suffer his rents to fall, instead of assisting him on a proper occasion, in order to make them afterwards rise the higher.

Those who live upon a determined income in money, and who are nowise employed in traffic, nor in any scheme of industry, will, by the augmentation of prices, be found in worse circumstances than before.

In a trading nation every man must turn his talents

to account, or he will undoubtedly be left behind in this universal emulation, in which the most industrious, the most ingenious, and the most frugal will constantly carry off the prize.

This consideration ought to be a spur to every body. The richest men in a trading nation have no security against poverty; we mean proportional poverty; for though they diminish nothing of their income, yet, by not increasing it in proportion to others, they lose their rank in wealth, and from the first class in which they stood they will slide insensibly down to a lower.

There is one consequence of an additional beneficial trade, which raises demand and increases wealth; but if we suppose no proportional augmentation of supply, it will prove at best but an airy dream which lasts for a moment, and when the gilded scene is passed away, numberless are the inconveniences which are seen to follow.

We shall now point out the natural consequences of this augmentation of wealth drawn from foreign nations, when the statesman remains inattentive to increase the supply both of food and manufactures, in proportion to the augmentation of mouths, and of the demand for the produce of industry.

In such a situation profits will daily swell, and every scheme for reducing them within the bounds of moderation, will be looked upon as a hurtful and unpopular measure: be it so; but let us examine the consequences.

We have said, that the rise of demand for manufactures naturally increases the value of work: now we must add, that under such circumstances, the augmentation of riches, in a country, either not capable of improvement as to the soil, or where precautions have not been taken for facilitating a multiplication of inhabitants, by the importation of subsistence, will be productive of the most calamitous consequences.

On one side, this wealth will effectually diminish the mass of the food before produced; and on the other, will increase the number of useless consumers. The first of these circumstances will raise the demand for food; and the second will diminish the number of useful free hands, and consequently raise the price of manufactures: here are shortly the outlines of this progress.

The more rich and luxurious a people are, the more delicate they become in their manner of living; if they fed on bread formerly, they will now feed on meat; if they fed on meat, they will now feed on fowl. The fane ground which feeds a hundred with bread, and a proportional quantity of animal food, will not maintain an equal number of delicate livers. Food must then become more scarce; demand for it rises; the rich are always the strongest in the market; they consume the food, and the poor are forced to starve. Here the wide door to modern distress opens; to wit, a hurtful competition for subsistence. Farther, when a people become rich, they think less of economy; a number of useless servants are hired, to become an additional dead weight on consumption; and when their starving countrymen cannot supply the extravagance of the rich so cheaply as other nations,

they either import instruments of foreign luxury, or seek to enjoy them out of their own country, and thereby make restitution of their gains.

Is it not therefore evident, that if, before things come to this pass, additional subsistence be not provided by one method or other, the number of inhabitants must diminish; although riches may daily increase by a balance of additional matter, supposed to be brought into the country in consequence of the hitherto beneficial foreign trade? This is not all. We say farther, that the beneficial trade will last for a time only. For the infallible consequence of the rise of prices at home will be, that those nations which at first consumed your manufactures, perceiving the gradual increase of their price, will begin to work for themselves; or finding out your rivals who can supply them cheaper, will open their doors to them. These again, perceiving the great advantages gained by your traders, will begin to supply the market; and since every thing must be cheaper in countries where we do not suppose the concurrence of all the circumstances mentioned above, these nations will supplant you, and be enriched in their turn.

Here comes a new revolution. Trade is come to a stop: what then becomes of all the hands which were formerly employed in supplying the foreign demands?

Were revolutions so sudden as we are obliged to represent them, all would go to wreck; in proportion as they happen by quicker or slower degrees, the inconveniences are greater or smaller.

Prices, we have said, are made to rise by competition. If the competition of the strangers was what raised them, the distress upon the manufacturers will be in proportion to the suddenness of their deserting the market. If the competition was divided between the strangers and the home-consumers, the inconveniences which ensue will be less; because the desertion of the strangers will be in some measure made up by an increase of home-consumption which will follow upon the fall of prices. And if, in the third case, the natives have been so imprudent, as not only to support a competition with the strangers, and thereby disgust them from coming any more to market, but even to continue the competition between themselves, the whole loss sustained by the revolution will be national. Wealth will cease to augment; but the inconveniences, in place of being felt by the manufacturers, will only affect the state; those will continue in affluence, extolling the generosity of their countrymen, and despising the poverty of the strangers who had enriched them.

Domestic luxury will here prove an expedient for preserving from ruin the industrious part of a people, who in subsisting themselves had enriched their country. No change will follow in their condition; they will go on with a painful assiduity to labour, and if the consequences of it become now hurtful to one part of the state, they must at least be allowed to be essentially necessary for the support of the other.

But that luxury is no necessary concomitant of foreign trade, in a nation where the true principles of it are understood, will appear very plain, from a contrast we are now going to point out, in the example

of a modern state, renowned for its commerce and frugality. The country is Holland.

A set of industrious and frugal people were assembled in a country by nature subject to many inconveniences, the moving of which necessarily employed abundance of hands. Their situation upon the continent, the power of their former masters, and the ambition of their neighbours, obliged them to keep great bodies of troops. These two articles added to the numbers of the community, without either enriching the state by their labour exported, or producing food for themselves or countrymen.

The scheme of a commonwealth was calculated to draw together the industrious; but it has been still more useful in subsisting them: the republican form of government being there greatly subdivided, vests authority sufficient in every part of it, to make suitable provision for their own subsistence; and the tie which unites them, regards only matters of public concern. Had the whole been governed by one sovereign, or by one council, this important matter never could have been effectuated.

It would be impossible for the most able minister that ever lived, to provide nourishment for a country so extended as France, or even as England, supposing these as fully peopled as Holland is: even although it should be admitted that a sufficient quantity of food might be found in other countries for their subsistence. The enterprise would be too great, abuses would multiply; the consequence would be, that the inhabitants would die for want. But in Holland the case is different, every little town takes care of its own inhabitants; and this care being the object of application and profit to so many persons, is accomplished with success.

When once it is laid down as a maxim in a country, that food must of necessity be got from abroad in order to feed the inhabitants at home, the corn-trade becomes considerable, and at the same time certain, regular, and permanent. This was the case in Holland: as the inhabitants were industrious, the necessary consequence has been, a very extraordinary multiplication; and at the same time such an abundance of grain, that, instead of being in want themselves, they often supply their neighbours. There are many examples of England's being supplied with grain from thence, and which is still more extraordinary, from the re-exportation of the very produce of its own fruitful soil.

It is therefore evident, that the only way to support industry, is to provide a supply of subsistence,

constantly proportional to the demand that may be made for it. This is a precaution indispensably necessary for preventing hurtful competition. This is the particular care of the Dutch: so long as it can be effectual, their state can fear no decline; but whenever they come to be distressed in the markets, upon which they depend for subsistence, they will sink into ruin. It is by mere dint of frugality, cheap and parsimonious living, that the navigation of this industrious people is supported. Constant employment, and an accumulation of almost imperceptible gains, fills their coffers with wealth, in spite of the large outgoings to which their own proper nourishment yearly forces them. The large profits upon industry in other countries, which are no proof of generosity, but a fatal effect of a scanty subsistence, is far from dazzling their eyes. They seldom are found in the list of competitors at any foreign port; if they have their cargo to dispose of, they wait with pleasure in their own vessels, consuming their own provisions, and at last accept of what others have left. It may be said, that many other circumstances concur in favour of the Dutch, besides the article of subsistence. Without disputing this matter, it may be observed, that if a computation be made of the hands employed in providing subsistence, and of those who are severally taken up in supplying every other want, their numbers will be found nearly to balance one another in the most luxurious countries. From this we may conclude, that the article of food, among the lower classes, must bear a very high proportion to all the other articles of their consumption; and therefore a diminution upon the price of subsistence, must be of infinite consequence to manufacturers, who are obliged to buy it. From this consideration, let us judge of the consequence of such augmentations upon the price of grain as are familiar to us; 30 or 40 *per cent.* seems nothing. Now this augmentation operates upon two-thirds, at least, of the whole expence of a labouring man: let any one who lives in tolerable affluence make the application of this to himself, and examine how he would manage his affairs if, by accidents of rains or winds, his expences were to rise 30 *per cent.* without a possibility of restraining them; for this is unfortunately the case with all the lower classes. From whence it may be concluded, that the keeping food cheap, and still more the preserving it at all times at an equal standard, is the fountain of the wealth of Holland; and that any hurtful competition in this article must beget a disorder which will affect the whole of the manufacturers of a state.

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COMMERCE, a handsome town of France in the duchy of Bar, with the title of a principality, and a magnificent castle. It is seated on the river Meuse, in E. Long. 5. 24. N. Lat. 48. 20.

COMMUNION, an office in the liturgy of the church of England, appointed to be read on Ash-Wednesday, or the first day of Lent. It is substituted in the room of that *godly discipline in the primitive church*, by which, (as the introduction to the office expresses it), “such persons, as stood convicted

of notorious sins, were put to open penance, and punished in this world, that their souls might be saved in the day of the Lord; and that others, admonished by their example, might be the more afraid to offend.” This discipline, in after ages, degenerated, in the church of Rome, into a formal confession of sins upon Ash-Wednesday, and the empty ceremony of sprinkling ashes upon the heads of the people. Our reformers wisely rejected this ceremony, as mere shadow and show; and substituted this office in its room, which

Comminatory Commission. is *A denunciation of God's anger and judgment against sinners*; that the people, being apprized of God's wrath and indignation against sin, may not, through want of discipline in the church, be encouraged to follow and pursue them; but rather be moved to supply that discipline to themselves, and so to avoid being judged and condemned at the tribunal of God.

COMMUNATORY, an appellation given to whatever threatens punishment, or some penalty. Thus, in France, when an exile is enjoined not to return under pain of death, it is deemed a *communatory* penalty; since if he do return, it is not strictly executed; but a second injunction is laid on him, which is more than comminatory, and, from the day of the date thereof, imports death without remedy.

COMMINGES, a province of France, 45 miles in length, and 15 in breadth; bounded on the north by Galcony, on the south by Catalonia, on the east by Coufferrans, and on the west by Bigorra. Its principal trade consists in cattle, mules and corn. St Bertrand is the capital town.

COMMUNUTION, denotes the breaking, or rather grinding, a body to very small particles.

COMMIRE (John), a celebrated Latin poet, born at Amboise in 1625, entered into the society of the Jesuits, and taught polite literature and divinity. He died at Paris, in 1702. We have a volume of his Latin poems, and a collection of his posthumous works. His odes and fables are more particularly admired.

COMMISSARY, in the ecclesiastical law, an officer of the bishop, who exercises spiritual jurisdiction in places of a diocese so far from the Episcopal see, that the chancellor cannot call the people to the bishop's principal consistory court, without giving them too much inconvenience.

COMMISSARY-Court, in Scots law, a court originally constituted by the bishops for executing in their name an usurped jurisdiction; and was anciently called the *bishop's-court*, *curia Christianitatis*, or *consistorial court*. This court was modelled by queen Mary at the Reformation, and continues till this day. See *LAW*, Part III. N° clix. 22—26.

COMMISSARY, in a military sense, is of three sorts.

COMMISSARY-General of the Muskets, an officer appointed to muster the army, as often as the general thinks proper, in order to know the strength of each regiment and company, to receive and inspect the musket-rolls, and to keep an exact state of the strength of the army.

COMMISSARY-General of the Stores, an officer in the artillery, who has the charge of all the stores, for which he is accountable to the office of ordnance.

COMMISSARY-General of Provisions, an officer who has the charge of furnishing the army with provisions.

COMMISSION, in common law, the warrant or letters patent, which all persons exercising jurisdiction have to empower them to hear or determine any cause or suit, as the commission of the judges, &c.

COMMISSION of Bankruptcy, is the commission that issues from the lord chancellor, on a person's becoming a bankrupt within any of the statutes, directed to certain commissioners appointed to examine into it,

and to secure the bankrupt's lands and effects for the satisfaction of his creditors. See the article *BANKRUPT*.

The proceedings on a commission of bankruptcy may be divided, 1. Into those which affect the bankrupt himself. 2. Into those which affect his property.

1. As to those of the former kind, there must in the first place be a petition to the lord chancellor by one creditor to the amount of L. 100, or by two to the amount of L. 150, or by three or more to the amount of L. 200; upon which he grants a *commission* to such discreet persons as to him shall seem good, who are then styled commissioners of bankruptcy. The petitioners, to prevent malicious applications, must be bound in a security of L. 200, to make the party amends, in case they do not prove him a bankrupt. And if, on the other hand, they receive any money or effects from the bankrupt, as a recompense for suing out the commission, so as to receive more than their rateable dividends of the bankrupt's estate, they forfeit not only what they shall have so received, but their whole debt. When the commission is awarded and issued, the commissioners are to meet at their own expence, and to take an oath for the due execution of their commission, and to be allowed a sum not exceeding 20s. *per diem* each, at every sitting. And no commission of bankruptcy shall abate or be void on any demise of the crown.

When the commissioners have received their commission, they are first to receive proof of the person's being a trader, and having committed some act of bankruptcy; and then to declare him bankrupt if proved so; and to give notice thereof in the gazette, and at the same time to appoint three meetings. At one of these meetings an election must be made of assignees, or persons to whom the bankrupt's estate shall be assigned, and in whom it shall be vested for the benefit of the creditors; which assignees are chosen by the major part, in value, of the creditors who shall then have proved their debts; but may be originally appointed by the commissioners, and afterwards approved or rejected by the creditors: but no creditor shall be admitted to vote in the choice of assignees, whose debt, on the balance of accounts, does not amount to L. 10. And at the third meeting at farthest, which must be on the 42^d day after the advertisement in the gazette, the bankrupt, upon notice also personally served upon him, or left at his usual place of abode, must surrender himself personally to the commissioners, and must thenceforth in all respects conform to the directions of the statutes of bankruptcy; or, in default thereof, shall be guilty of felony without benefit of clergy, and shall suffer death, and his goods and estate shall be divided among his creditors.

In case the bankrupt absconds, or is likely to run away between the time of the commission issued, and the last day of surrender, he may, by warrant from any judge or justice of the peace, be apprehended and committed to the county goal, in order to be forthcoming to the commissioners, who are also empowered immediately to grant a warrant for seizing his goods and papers.

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When the bankrupt appears, the commissioners are to examine him touching all matters relating to his trade and effects. They may also summon before them, and examine, the bankrupt's wife, and any other person whatsoever, as to all matters relating to the bankrupt's affairs: And in case any of them shall refuse to answer, or shall not answer fully, to any lawful question, or shall refuse to subscribe such their examination, the commissioners may commit them to prison without bail, till they make and sign a full answer; the commissioners specifying in their warrant of commitment the question so refused to be answered. And any gaoler, permitting such person to escape or go out of prison, shall forfeit L. 500 to the creditors.

The bankrupt upon this examination, is bound, upon pain of death, to make a full discovery of all his estate and effects as well in expectancy as possession, and how he has disposed of the same; together with all books and writings relating thereto: and is to deliver up all in his power to the commissioner; (except the necessary apparel of himself, his wife, and his children); or, in case he conceals or embezzles any effects to the amount of L. 20, or with-holds any books or writings, with intent to defraud his creditors, he shall be guilty of felony without benefit of clergy.

After the time allowed the bankrupt for such discovery is expired, any other person voluntarily discovering any part of his estate before unknown to the assignees, shall be entitled to five *per cent.* out of the effects so discovered, and such farther reward as the assignees and commissioners shall think proper. And any trustee wilfully concealing the estate of any bankrupt, after the expiration of 42 days, shall forfeit L. 100, and double the value of the estate concealed, to the creditors.

Hitherto every thing is in favour of the creditors; and the law seems to be pretty rigid and severe against the bankrupt; but, in case he proves honest, it makes him full amends for all this rigour and severity. For, if the bankrupt hath made an ingenuous discovery, hath conformed to the directions of the law, and hath acted in all points to the satisfaction of his creditors; and if they, or four parts in five of them in number and value, (but none of them creditors for less than L. 20), will sign a certificate to that purport; the commissioners are then to authenticate such certificate under their hands and seals, and to transmit it to the lord chancellor: and he, or two judges whom he shall appoint, on oath made by the bankrupt that such certificate was obtained without fraud, may allow the same; or disallow it, upon cause shewn by any of the creditors of the bankrupt.

If no cause be shewn to the contrary, the certificate is allowed of course; and then the bankrupt is entitled to a decent and reasonable allowance out of his effects, for his future support and maintenance, and to put him in a way of honest industry. This allowance is also in proportion to his former good behaviour, in the early discovery of the decline of his affairs, and thereby giving his creditors a larger dividend. For if his effects will not pay one half of his debts, or 10s. in the pound, he is left to the discretion

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of the commissioners and assignees, to have a competent sum allowed him, not exceeding 3 *per cent.*; but if they pay 10s. in the pound, he is to be allowed 5 *per cent.*; if 12s. and 6d. then 7 $\frac{1}{2}$ *per cent.*; and if 15s. in the pound, then the bankrupt shall be allowed 10 *per cent.*; provided that such allowance do not in the first case exceed L. 200, in the second L. 250, and in the third L. 300.

Besides this allowance he has also an indemnity granted him, of being free and discharged forever from all debts owing by him at the time he became a bankrupt; even though judgment shall have been obtained against him, and he lies in prison upon execution for such debts; and, for that among other purposes, all proceedings on commission of bankrupt, are on petition, to be entered on record, as a perpetual bar against actions to be commenced upon this account: though, in general, the production of the certificate properly allowed shall be sufficient evidence of all previous proceedings. Thus the bankrupt becomes a clear man again; and, by the assistance of his allowance and his own industry, may become a useful member of the commonwealth: which is the rather to be expected, as he cannot be entitled to these benefits, but by the testimony of his creditors themselves of his honest and ingenuous disposition; and unless his failures have been owing to misfortunes, rather than to misconduct and extravagance.

2. As to the proceedings which affect the bankrupt's property.

By virtue of the statutes before-mentioned, all the personal estate and effects of the bankrupt, are considered as vested, by the act of bankruptcy, in the future assignees of his commissioners, whether they be goods in actual possession, or debts, contracts, and other choses in action; and the commissioners by their warrant may cause any house or tenement of the bankrupt to be broke open, in order to enter upon and seize the same. And when the assignees are chosen or approved by the creditors, the commissioners are to assign every thing over to them; and the property of every part of the estate is thereby as fully vested in them as it was in the bankrupt himself, and they have the same remedies to recover it.

The property vested in the assignees is the whole that the bankrupt had in himself, at the time he committed the first act of bankruptcy, or that has been vested in him since, before his debts are satisfied or agreed for. Therefore it is usually said, that once a bankrupt, and always a bankrupt: by which is meant, that a plain direct act of bankruptcy once committed, cannot be purged, or explained away, by any subsequent conduct, as a dubious equivocal act may be; but that, if a commission is afterwards awarded, the commission and the property of the assignees shall have a relation, or reference, back to the first and original act of bankruptcy. Inasmuch that all transactions of the bankrupt are from that time absolutely null and void, either with regard to the alienation of his property, or the receipt of his debts from such as are privy to his bankruptcy; for they are no longer his property, or his debts, but those of the future assignees. And if an execution be sued out, but not served and executed

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on the bankrupt's effects till after the act of bankruptcy, it is void, as against the assignees. But the king is not bound by this fictitious relation, nor is within the statutes of bankrupts; for if, after the act of bankruptcy committed, and before the assignment of his effects, an extent issues for the debt of the crown, the goods are bound thereby. In France this doctrine of relation is carried to a very great length; for there, every act of a merchant, for 10 days precedent to the act of bankruptcy, is presumed to be fraudulent, and is therefore void. But with us the law stands upon a more reasonable footing: for as these acts of bankruptcy may sometimes be secret to all but a few, and it would be prejudicial to trade to carry this notion to its utmost length, it is provided by stat. 19 Geo. II. c. 32. that no money paid by a bankrupt to a *bona fide*, or real, creditor, in a course of trade, even after an act of bankruptcy done, shall be liable to be refunded. Nor by stat. 1 Jac. I. c. 15. shall any debtor of a bankrupt that pays him his debt without knowing of his bankruptcy, be liable to account for it again. The intention of this relative power being only to reach fraudulent transactions, and not to distress the fair trader.

The assignees may pursue any legal method of recovering this property so vested in them, by their own authority; but cannot commence a suit in *equity*, nor compound any debts owing to the bankrupt, nor refer any matters to arbitration without the consent of the creditors, or the major part of them in value, at a meeting to be held in pursuance of notice in the gazette.

When they have got in all the effects they can reasonably hope for, and reduced them to ready money, the assignees must, within 12 months after the commission issued, give 21 days notice to the creditors of a meeting for a dividend or distribution; at which time they must produce their accounts, and verify them upon oath, if required. And then the commissioners shall direct a dividend to be made, at so much in the pound, to all creditors who have before proved, or shall then prove, their debts. This dividend must be made equally, and in a rateable proportion, to all the creditors, according to the quantity of their debts; no regard being had to the quality of them. Mortgages, indeed, for which the creditor has a real security in his own hands, are entirely safe; for the commission of bankrupt reaches only the equity of redemption. So are also personal debts, where the creditor has a chattel in his hands, or a pledge or pawn, for the payment, or has taken the debtor's lands or goods in execution. And, upon the equity of the stat. 8 An. c. 14. (which directs, that upon all executions of goods being on any premises demised to a tenant, one year's rent and no more shall, if due, be paid to the landlord) it hath also been held, that under a commission of bankrupt, which is in the nature of a statute execution, the landlord shall be allowed his arrears of rent to the same amount, in preference to other creditors, even though he hath neglected to distrein while the goods remained on the premises: which he is otherwise entitled to do for his entire rent be the quantum what it may. But otherwise

judgments and recognizances, (both which are debts of record, and therefore at other times have a priority), and also bonds and obligations by deed or special instrument, (which are called debts by specialty, and are usually the next in order) these are all put on a level with debts by mere simple contract, and all paid *pari passu*. Nay, so far is this matter carried, that, by the express provision of the statutes, debts not due at the time of the dividend made, as bonds or notes of hand, payable at a future day, shall be paid equally with the rest, allowing a discount or drawback in proportion. And insurances, and obligations upon bottomry or respondentia, *bona fide*, made by the bankrupt, though forfeited after the commission is awarded, shall be looked upon in the same light as debts contracted before any act of bankruptcy.

Within 18 months after the commission issued, a second and final dividend shall be made, unless all the effects were exhausted by the first. And if any surplus remains, after paying every creditor his full debt, it shall be restored to the bankrupt. This is a case which sometimes happens to men in trade, who involuntarily, or at least unwarily, commit acts of bankruptcy, by absconding and the like, while their effects are more than sufficient to pay their creditors. And if any suspicious or malevolent creditor will take the advantage of such acts, and sue out a commission, the bankrupt has no remedy, but must quietly submit to the effects of his own imprudence: except that, upon satisfaction made to all the creditors, the commission may be superseded. This case may also happen when a knave is desirous of defrauding his creditors, and is compelled, by a commission, to do them that justice which otherwise he wanted to evade. And therefore, though the usual rule is, that all interest on debts carrying interest shall cease from the time of issuing the commission, yet in case of a surplus left after payment of every debt, such interest shall again revive, and be chargeable on the bankrupt or his representatives.

COMMISSION of Lunacy, issues out of the court of chancery, whether a person represented to be a lunatic, be so or not. See LUNACY.

COMMISSION-Officers. See OFFICERS.

COMMISSION, in commerce. See FACTORAGE.

COMMISSIONER, a person authorized by commission, letters patent, or other lawful warrant, to examine any matters, or execute any lawful commission.

COMMISSIONER in the General Assembly of the church of Scotland. See GENERAL ASSEMBLY.

COMMISSIONERS of the Customs. See CUSTOMS.

COMMISSIONERS of Excise. See EXCISE.

COMMISSIONERS of the Navy. See NAVY.

Lords COMMISSIONERS of the Treasury. See TREASURY and EXCHEQUER.

COMMISSURE, **COMMISSURA**, a term used by some authors, for the small meat's or interstices of bodies; or the little clefts between the particles; especially when those particles are broadish and flat, and lie contiguous to one another, like thin plates or lamellæ. See PORE. The word literally signifies a *joining*, or connecting of one thing to another.

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COMMISSURE, in architecture, &c. denotes the joint of two stones; or, the application of the surface of the one to that of the other. See MASONRY.

Among anatomists, *commis sure* is sometimes also used for a future of the cranium, or skull. See SUTURE.

COMMITMENT, in criminal law, is the sending to prison a person who hath been guilty of any crime. This takes place where the offence is not bailable, or the party cannot find BAIL; must be by proper warrant, containing the cause of the commitment; and continues till put an end to by the course of law, (see TRIAL); imprisonment being intended only for safe custody, and not for punishment, (see ARRESTMENT and BAIL). In this dubious interval between the commitment and trial, a prisoner ought to be used with the utmost humanity; and neither be loaded with needless fetters or subjected to other hardships than such as are absolutely requisite for the purpose of confinement only: though, what are so requisite, must too often be left to the discretion of the gaolers; who are frequently a merciless race of men, and, by being conversant in scenes of misery, steeled against any tender sensation.

COMMITMENT of Bankruptcy. See COMMISSION of Bankruptcy.

COMMITTEE, one or more persons to whom the consideration or ordering of a matter is referred, either by some court, or by the consent of parties to whom it belongs.

COMMITTEE of Parliament, a certain number of members appointed by the house, for the examination of a bill, making a report of an inquiry, process of the house, &c. See PARLIAMENT.

COMMIXION, in Scots law, is a method of acquiring property, by mixing or blending together different substances belonging to different proprietors. See LAW, Part III. N^o cxlii. 8.

COMMODATE, COMMODATUM, in the civil jurisprudence, the loan, or free concession of any thing moveable or immoveable, for a certain time, on condition of restoring again the same individual after a certain term. The *commodate* is a kind of loan: there is this difference, however, between a loan and a *commodate*, that the latter is gratis, and does not transfer the property: the thing must be returned in essence, and without impairment: so that things which consume by use, or time, cannot be objects of a *commodate*, but of a loan; in regard they may be returned in kind, though not in identity. See LAW, Part III. N^o dxxiii. 8.

COMMODIANUS (Gazeus), a Christian author in the 4th century, who wrote a work in Latin verse, intitled Instructions; the moral of which is excellent, but the verse extremely heavy. M. Davies published a fine edition of it, in 1711, at the end of Minucius Felix.

COMMODITY, in a general sense, denotes all sorts of wares and merchandizes whatsoever, that a person deals or trades in.

Staple COMMODITIES, such wares and merchandizes as are commonly and readily sold in a market, or exported abroad; being, for the most part, the proper produce, or manufacture of the country.

COMMODORE, a general officer in the British ma-

rine, invested with the command of a detachment of ships of war defined on any particular enterprise, during which time he bears the rank of brigadier-general in the army, and is distinguished from the inferior ships of his Squadron by a broad red pendant tapering towards the outer-end, and sometimes forked. The word is corrupted from the Spanish, *comendador*.

COMMODORE, is also a name given to some select ship in a fleet of merchantmen, who leads the van in time of war, and carries a light in his top to conduct the rest, and keep them together.

COMMON, COMMUNIS, something that belongs to all alike; is owned or allowed by all; and not confined to this more than that. In which sense, *common* stands opposed to *proper*, *peculiar*, &c. Thus, the earth is said to be our *common* mother; in the first, or golden age, all things were in *common*, as well as the sun and elements: the name animal is *common* to man and beast; that of substance to body and spirit.

COMMON Council. See COUNCIL.

COMMON Law, that body of law received as rules in these kingdoms, before any statute was enacted in parliament to alter the same. See LAW, Part II. n^o 36.

COMMON-PLACE Book, is a register of what things occur, worthy to be noted, in the course of a man's thinking or study, so disposed, as that, among a number of subjects any one may be easily found. The advantages of making a common-place book are many: it not only makes a man read with accuracy and attention, but induces him insensibly to think for himself, provided he considers it not so much as a register of sentiments that strike him in the course of reading, but as a register of his own thoughts upon various subjects. Many valuable thoughts occur even to men of no extraordinary genius. These, without the assistance of a common place-book, are generally lost both to himself and others. There are various methods of arranging common-place books; that of Mr Locke is as good as any that have hitherto been contrived.

The first page of the book you intend to take down their *common-place* in, is to serve as a kind of index to the whole; and to contain references to every place or matter therein: in the commodious contrivance of which index, so as it may admit of a sufficient copia or variety of materials, without any confusion, all the secret of the method consists.

In order to this, the first page, as already mentioned, or, for more room, the two first pages that front each other, are to be divided, by parallel lines, into 25 equal parts; whereof, every 5th line to be distinguished, by its colour or other circumstance. These lines are to be cut perpendicularly by others, drawn from top to bottom; and in the several spaces thereof, the several letters of the alphabet, both capital and minuscule, are to be duly wrote.

The form of the lines and divisions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following specimen; wherein, what is to be done in the book for all the letters of the alphabet, is here shewn in the first four, *A, B, C, and D*.

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place.

C O M	
A	a
	e
	i
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B	a
	e 2, 3.
	i
	u

C O M	
C	a
	e
	i
	u
D	a
	i
	u
	u

The index of the common-place book thus formed, matters are ready for the taking down any thing therein.

In order to this, consider to what head the thing you would enter is most naturally referred; and under which one would be led to look for such a thing: in this head, or word, regard is had to the initial letter, and the first vowel that follows it; which are the characteristic letters whereon all the use of the index depends.

Suppose (*e. gr.*) I would enter down a passage that refers to the head *beauty*; *B*, I consider, is the initial letter, and *e* the first vowel: then, looking upon the index for the partition *B*, and therein the line *e*, (which is the place for all words whose first letter is *b*, and first vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blemishes*), and finding no numbers already down to direct me to any page of the book where words of this characteristic have been entered, I turn forward to the first blank page I find, (which, in a fresh book, as this is supposed to be, will be page 2^d), and here write what I have occasion for on the head *beauty*; beginning the line in the margin, and indenting all the other subservient lines, that the head may stand out and shew itself: this done, I enter the page where it is wrote, *viz.* 2, in the index in the space *B e*; from which time, the class *b e* becomes wholly in possession of the 2^d and 3^d pages, which are assigned to letters of this characteristic.

Had I found any page or number already entered in the space *B e*, I must have turned to the page, and have wrote my matter in what room was left therein: so, if after entering the passage on *beauty*, I should have occasion for *benevolence*, or the like, finding the number 2 already possessed of the space of this characteristic, I begin the passage on *benevolence* in the remainder of the page, which not containing the whole, I carry it on to page 3^d, which is also for *b e*; and add the number 3 in the index.

COMMON *Pleas*, is one of the king's courts now held constantly in Westminister-hall, but in former times was moveable.

All civil causes, as well real as personal, are, or were formerly, tried in this court, according to the strict law of the land. In personal and mixed actions it has a concurrent jurisdiction with the king's bench, but has no cognizance of pleas of the crown. The actions belonging to the court of common pleas come thither by original, as arrests and outlawries; or by privilege, or attachment for or against privileged persons; or out of inferior courts, not of record, by *pone*,

recordari, *accedas ad curiam*, writ of false judgment, &c. The chief judge of this court is called lord Chief Justice of the common pleas, who is assisted by three other judges: the other officers of the court are the *custos brevium*, who is the chief clerk; three prothonotaries, and their secondaries; the clerk of the warrants, clerk of the *essoins*, 14 filazers, 4 exigentors, a clerk of the juries, the chirographer, the clerk of the king's silver, clerk of the treasury, clerk of the seal, clerk of the outlawries, clerk of the inrolment of fines and recoveries, and clerk of the errors.

COMMON, in law, that soil, the use of which is common to this or that town or lordship. There is common of pasture for cattle; and also common of fishing; common of estovers; common of turbary, &c.

COMMON-Prayer is the liturgy in the church of England: see LITURGY. Clergymen are to use the public form of prayers prescribed by the Book of Common Prayer; and refusing to do so, or using any other public prayers, are punishable by stat. 1 Eliz. c. ii.

COMMON, in grammar, denotes the gender of nouns, which are equally applicable to both sexes: thus, *parens*, "a parent," is of the common gender.

COMMON, in geometry, is applied to an angle, line, or the like, which belongs equally to two figures:

COMMON *Divisor*, a quantity or number which exactly divides two or more other quantities or numbers, without leaving any remainder.

COMMONALTY, the lower of the two divisions of the civil state. See CIVIL State.

The commonalty, like the nobility, are divided into several degrees: and as the lords, though different in rank, yet all of them are peers in respect of their nobility; so the commoners, though some are greatly superior to others, yet all are in law commonalty, in respect of their want of nobility.

1. The first name of dignity, next beneath a peer, was anciently that of *vidames*, *vice-domini*, or *valou-fors*: who are mentioned by our ancient lawyers, as *vir* magnæ dignitatis; and Sir Edward Coke speaks highly of them. Yet they are now quite out of use; and our legal antiquarians are not agreed upon even their original or ancient office.

2. Now, therefore, the first personal dignity, after the nobility, is a knight of the order of St George, or of the garter; first instituted by Edw. III. A.D. 1344.

3. Next, (but not till after certain official dignities, as privy-counsellors, the chancellors of the exchequer and duchy of Lancaster, the chief justice of the king's bench, the master of the rolls, and the other English judges), follows a *knicht banneret*; who indeed, by statutes

statutes 5 Richard II. stat. 2. c. 4. and 14 Richard II. c. 11. is ranked next after barons; and his precedence before the younger sons of viscounts, was confirmed to him by order of king James I. in the 10th year of his reign. But in order to entitle him to this rank, he must have been created by the king in person, in the field, under the royal banners, in time of open war; else he ranks after

4. *Baronets*; who are the next in order: which title is a dignity of inheritance, created by letters patent, and usually descendible to the issue-male. It was first instituted by king James I. A. D. 1611, in order to raise a competent sum for the reduction of the province of Ulster in Ireland; for which reason all baronets have the arms of Ulster superadded to their family-coat.

5. Next follow *knights of the Bath*; an order instituted by king Henry IV. and revived by king Geo. I. They are so called from the ceremony of bathing the knight before their creation.

6. The last of these inferior nobility are *knights bachelor*; the most ancient, though the lowest, order of knighthood amongst us: for we have an instance of king Alfred's conferring this order on his son Athelstan.

7. The above, with those enumerated under the article NOBILITY, Sir Edward Coke says, are all the names of *dignity* in this kingdom; *esquires* and *gentlemen* being only names of *worship*. But before these last the heralds rank all colonels, serjeants at law, and doctors in the three learned professions.

8. *Esquires* and *gentlemen* are confounded together by Sir Edward Coke; who observes, that every esquire is a gentleman, and a gentleman is defined to be one *qui arma gerit*, "who bears coat-armour," the grant of which adds gentility to a man's family: in like manner as civil nobility among the Romans was founded in the *ius imaginum*, or having the image of one ancestor at least who had borne some curule office. It is indeed a matter somewhat unsettled what constitutes the distinction, or who is a real esquire; for it is not an estate, however large, that confers this rank upon its owner. Camden, who was himself a herald, distinguishes them the most accurately; and he reckons up four sorts of them: 1st, The eldest sons of knights, and their eldest sons, in perpetual succession. 2^d, The eldest sons of younger sons of peers, and their eldest sons, in like perpetual succession: both which species of esquires, Sir Henry Spelman intitles *armigeri natalitii*. 3^d, Esquires created by the king's letters patent, or other investiture; and their eldest sons. 4th, Esquires by virtue of their office; as justices of the peace and others who bear any office of trust under the crown. To these may be added the esquires of the knights of the bath, each of whom constitutes three at his installation; and all foreign, nay, Irish peers; for not only these, but the eldest sons of peers of Great Britain, though frequently titular lords, are only esquires in the law, and must be so named in all legal proceedings.

9. As for *gentlemen*, says Sir Thomas Smith, they be made good cheap in this kingdom: for whosoever studieth the laws of the realm, who studieth in the universities, who professeth liberal sciences, and (to be

short) who can live idly and without manual labour, Commoner
1 Commons.
and will bear the part, charge, and countenance of a gentleman, he shall be called master, and shall be taken for a gentleman.

10. A *yeoman* is he that hath free land of 40 s. by the year; who is thereby qualified to serve on juries, vote for knights of the shire, and do any other act where the law requires one that is *probus et legalis homo*.

11. The rest of the commonalty are *tradesmen, artificers, and labourers*; who (as well as all others) must, in pursuance of the statute 1 Henry V. c. 5. be styled by the name and addition of their estate, degree or mystery, in all actions and other legal proceedings.

COMMONER, or GENTLEMAN-COMMONER, in the universities, a student entered in a certain rank.

COMMONS, or HOUSE OF COMMONS, a denomination given to the lower house of parliament. See PARLIAMENT.

The commons consist of all such men of any property in the kingdom, as have not seats in the house of lords, every one of which has a voice in parliament, either personally, or by his representatives. In a free state every man, who is supposed a free agent, ought to be, in some measure, his own governor; and therefore a branch at least of the legislative power should reside in the whole body of the people. And this power, when the territories of the state are small, and its citizens easily known, should be exercised by the people in their aggregate or collective capacity, as was wisely ordained in the petty republics of Greece, and the first rudiments of the Roman state. But this will be highly inconvenient when the public territory is extended to any considerable degree, and the number of citizens is increased. Thus when, after the social war, all the burghers of Italy were admitted free citizens of Rome, and each had a vote in the public assemblies, it became impossible to distinguish the spurious from the real voter, and from that time all elections and popular deliberations grew tumultuous and disorderly; which paved the way for Marius and Sylla, Pompey and Cæsar, to trample on the liberties of their country, and at last to dissolve the commonwealth. In so large a state as ours, therefore, it is very wisely contrived, that the people should do that by their representatives, which it is impracticable to perform in person; representatives chosen by a number of minute and separate districts, where in all the voters are or may be easily distinguished. The counties are therefore represented by knights, elected by the proprietors of lands; the cities and boroughs are represented by citizens and burghesses, chosen by the mercantile or supposed trading interest of the nation; much in the same manner as the burghers in the diet of Sweden are chosen by the corporate towns, Stockholm sending four, as London does with us, other cities two, and some only one. The number of English representatives is 513, of Scots 45; in all 558. And every member, though chosen by one particular district, when elected and returned, serves for the whole realm. For the end of his coming thither is not particular but general; not barely to advantage his constituents, but the commonwealth; to advise his majesty, as appears from the writ of summons,

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mons, "de communi consilio super negotiis quibufdam arduis et urgentibus, regem, statum et defensionem regni Angliæ et ecclesiæ Anglicanæ concernentibus." And therefore he is not bound, like a deputy in the united provinces, to consult with, or take the advice of, his constituents upon any particular point, unless he himself thinks it proper or prudent to do so.

The peculiar laws and customs of the house of commons relate principally to the raising of taxes, and the elections of members to serve in parliament. See TAXES and ELECTIONS.

Doctors Commons. See COLLEGE of civilians.

Proctor of the Commons. See PROCTOR.

COMMONTY, in Scots law, sometimes signifies lands belonging to two or more common proprietors; sometimes a heath or muir though it should belong in property to one, if there has been a promiscuous possession upon it by pasturage; and the act 1695 mentions commonities belonging in property to the king and to royal boroughs. See LAW, Part III. N^o cxxxv. 16.

COMMONWEALTH. See REPUBLIC.

COMMOTE, an ancient term in Wales, denoting half a cantred, or hundred; containing 50 villages. See HUNDRED. Wales was anciently divided into three provinces; each of these subdivided into cantreds; and every cantred into two commotes or hundreds. Silvester Girald, however, tells us in his itinerary, that a commote is but a quarter of a hundred.

COMMUNES, in botany, the name of a class in Linnæus's *methodus Calycina*, consisting of plants which, like teasel and dandelion, have a calix or flower-cup common to many flowers or florets. These are the aggregate or compound flowers of other systems.

COMMUNIBUS LOCIS, a Latin term, in frequent use among philosophical, &c. writers; implying some medium, or mean relation, between several places. Dr Keil supposes the ocean to be one quarter of a mile deep, *communibus locis*, *q. d.* at a medium, or taking one place with another.

COMMUNIBUS ANNIS, has the same import with regard to years, that communibus locis has with regard to places. Mr Derham observes that the depth of rain, *communibus annis*, or one year with another, were it to stagnate on the earth, would amount in Townley in Lancashire, to 42½ inches; at Upminster in Essex, to 19½; at Zurich, 32½; at Pisa, 43½; and at Paris to 19 inches.

COMMUNICATION, in a general sense, the act of imparting something to another.

COMMUNICATION is also used for the connection of one thing with another, or the passage from one place to another: thus a gallery is a communication between two apartments.

COMMUNICATION of motion, the act whereby a body at rest is put into motion by a moving body; or, it is the acceleration of motion in a body already moving.

Lines of Communication, in military matters, trenches made to continue and preserve a safe correspondence between two forts or posts; or at a siege,

between two approaches, that they may relieve one another.

Canal of Communication. See CANAL.

COMMUNION, in matters of religion, the being united in doctrine and discipline; in which sense of the word, different churches are said to hold communion with each other.

In the primitive Christian church, every bishop was obliged, after his ordination, to send circular letters to foreign churches, to signify that he was in communion with them. The three grand communions into which the Christian church is at present divided, is that of the church of Rome, the Greek church, and the Protestant church: but originally all Christians were in communion with each other, having one common faith and discipline.

COMMUNION is also used for the act of communicating in the sacrament of the eucharist, or the Lord's supper. See RELIGION.

COMMUNION Service, in the liturgy of the church of England, the office for the administration of the holy sacrament, extracted from several ancient liturgies, as those of St Basil, St Ambrose, &c.

By the last rubric, part of this service is appointed to be read every Sunday and holiday, after the morning prayer, even though there be no communicants.

COMMUNITY, a society of men living in the same place, under the same laws, the same regulations, and the same customs.

COMMUTATION in law, the change of a penalty or punishment from a greater to a less; as when death is commuted for banishment, &c.

COMMENA (Ann) daughter of Alexis Comnenes emperor of the East; memorable for her great learning and virtue, and for her history of the life and actions of her father, which is highly esteemed. She flourished about the year 1117.

COMO, a strong and populous town of Italy, in the duchy of Milan, and in the Comasco, with a bishop's see. It was taken by the Imperialists in 1706, and is seated on a lake of the same name in E. Long. 8. 57. N. Lat. 45, 45.

Como, the lake so called, is the largest in Italy. It is situated in the duchy of Milan in the Comasco, on the confines of Swisserland and the Grisons. It is 88 miles in circumference, yet is not above 6 miles over in any part.

COMORA islands, lie between the north end of the island of Madagascar, and the coast of Zanguebar, from 10 to 15 degrees south latitude. Authors differ greatly with regard to their number, some speaking of three, others of five, and some of eight of these islands. They all abound in horned cattle, sheep, hogs, and a variety of fruits common in warm countries. They are said also to produce a kind of rice which turns of a violet colour when boiled. The most remarkable of them, and which the Europeans are best acquainted with, is the island of Johanna. See that article.

COMORIN, or CAPE COMORIN, the most southerly promontory of the bither India, lying north-west of the island of Ceylon.

COMORRA, a handsome and large town of lower Hungary, and capital of a territory of the same name.

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Commora.

name. It is so well fortified, that the Turks could never take it. The greatest part of the inhabitants are Hungarians or Ruffians, who are very rich, and are of the Greek religion. It is seated on the river Danube, in the island of Sihut, E. Lon. 18. 25. N. Lat. 47. 50.

COMOSÆ, in botany, from *Coma*. An order of plants in the former editions of Linnæus's Fragments of a Natural Method, consisting of the spiked willow or *Spiræa frutex*, dropwort, and greater meadow-sweet. These, though formerly distinct genera, are by Linnæus collected into one, under the name of *Spiræa*. The flowers, growing in a head, resemble a bush, or tuft of hair, which probably gave rise to the epithet *Comosæ*.

COMPACT, in philosophy, is said of bodies which are of a close, dense, and heavy texture, with few pores, and those very small.

COMPACT, in a legal sense, signifies an agreement, or contract stipulated between several parties.

COMPANY, in a commercial sense, is a society of merchants, mechanics, or other traders, joined together in one common interest. The word is formed of the French *compagnie*, and that of *compagnie*, or *compagnis*, which Chifflet observes, are found in the Salique law, tit. 66, and are properly military words, understood of soldiers, who, according to the modern phrase, are comrades or mess-mates, *i. e.* lodge together, eat together, &c. of the Latin *cum* "with," and *panis* "bread." It may be added, that in some Greek authors, under the western empire, the word *Κατωσανα* occurs in the sense of *society*; but it is more probable that the Greeks borrowed it from the French or Italians.

When there are only two or three joined in this manner, it is called a partnership; the term *company* being restrained to societies consisting of a considerable number of members, associated together by a charter obtained from the prince.

The mechanics of all corporations, or towns incorporated, are thus erected into companies, which have charters of privileges and large immunities.

We shall here give some account of the principal companies of merchants, some of which trade with joint stocks, and all of them enjoy by charter many exclusive privileges. For, however injurious these companies may, at this time of day, be reckoned to the nation in general, yet it is certain, that they were the original parents of all our foreign commerce; private traders upon their own bottom being discouraged from hazarding their fortunes in foreign countries, till the methods of traffic had been settled by joint-stock companies: and from this very principle it is, that we find several nations at present endeavouring to extend their trade by the same means. The most ancient trading company, in Britain, is the Hamburgh company, originally called *merchants of the Staple*, and afterwards *merchant adventures*: they were incorporated by king Edward IV. from which time they traded with success till the reign of queen Elizabeth, who, for a further encouragement of their industry, not only confirmed, but enlarged their privileges. However, it ought to be observed, that this trade is now open to private merchants, upon paying a very small sum to the company. The company of this kind, next

Company. incorporated, was that of the Russia-merchants; who having improved their trade and commerce in those remote parts, were incorporated by Edward VI. greatly encouraged by queen Mary, and had their confirmation, with an enlargement of their privileges, from Elizabeth. This company is not very considerable at present; the trade of those parts being mostly carried on by private merchants, on paying the sum of 5*l.* to the company.

The Eastland company, formerly called merchants of Elbin, were incorporated by queen Elizabeth, and by her greatly encouraged; but, like the former company, it is now become inconsiderable, the trade of Norway and Sweden being laid open by act of parliament.

The Turkey, or Levant company, was likewise incorporated by the same prince, and its charter confirmed and enlarged by king James I. who empowered them to trade to the Levant, or eastern parts of the Mediterranean; particularly to Smyrna, Aleppo, Alexandria, Grand-Cairo, and the other parts of the Turkish dominions. But this trade is now also laid open to private merchants, upon paying a small consideration.

The next in order is the East-India company, first incorporated in the year 1600, and empowered to trade to all countries lying eastward of the cape of Good Hope. Towards the end of king William's reign, an act of parliament passed, granting all private merchants, who should raise a certain sum for the supply of the government, the privilege of trading to these parts. Accordingly, a great many subscribed, and were called the New East-India company; which soon found it necessary to unite with the old one, and trade with one joint stock: since which time, they have been styled the united East-India company; and are at present in a flourishing condition, and in possession of many considerable forts and factories on the coast of Malabar, the Coromandel-coast, the bay of Bengal, &c.

The royal African company was first erected in the year 1661, with an exclusive privilege to trade from cape Blanc, on the coast of Africa, in 20° N. Lat. as far as the cape of Good Hope. But this trade is now laid open by act of parliament.

The Eastland company, the Greenland company, the Hudson's-bay company, the South-sea company, have likewise their several charters and privileges for trading to the places from which they take their denominations.

These are the principal trading companies belonging to the crown of Great Britain; and of a similar nature are the Dutch East and West India companies, the French East and West India companies, &c.

Concerning these companies, it may be proper to remark, that however necessary they might be in the infancy of trade, they are now looked upon by most men in the light of monopolies: hence it is, that their privileges have from time to time been lessened, in order to establish an absolutely free and general trade; and experience hath shewn, that the trade of the nation has advanced in proportion as monopolies have been laid aside. Indeed, to carry on trade with distant countries, where forces and forts are to be maintained, a company with a joint stock seems necessary;

er, at least, certain duties ought to be paid by all who trade thither, towards defraying the said expences: for not to speak of the East-India, Hudson's-bay, &c. companies, the expence of maintaining whole forts must be very considerable, even the Hurky, Hamburgh, Moscow, and Eastland companies, which do not trade with a joint stock, are nevertheless obliged to be at considerable charges, in making presents to the grand signior and his ministers, maintaining consuls, &c. It would therefore be unjust that any should trade to the places within their charters, without paying the same duties toward's the company's charge, as the present adventurers pay; but then there appears to be no reason why any of the king's subjects should be barred from trading to those places, or forced to pay a great fine for admission, that are willing to pay the company's duties, and submit to their regulations and orders in other respects.

On the whole, as all restrictions of trade are found to be hurtful, nothing can be more evident than that no company whatsoever, whether they trade in a joint stock, or only under regulation, can be for the public good, except it may be easy for all or any of his majesty's subjects to be admitted into all or any of the

said companies, at any time, and for a very inconsiderable fine.

COMPANY, in military affairs, a small body of foot, commanded by a captain, who has under him a lieutenant and ensign.

The number of centinels or private soldiers in a company, may be from 50 to 80; and a battalion consists of 13 such companies, one of which is always grenadiers, and posted on the right; next them stand the eldest company, and on the left the second company; the youngest one being always posted in the centre. Companies not incorporated into regiments are called irregulars, or independent companies.

Artillery COMPANY. See ARTILLERY.

COMPANY OF SHIPS, a fleet of merchantmen, who make a charter party among themselves; the principal conditions whereof usually are, that certain vessels shall be acknowledged admiral, vice-admiral, and rear-admiral; that such and such signals shall be observed; that those which bear no guns, shall pay so much *per cent.* of their cargo; and in case they be attacked, that what damages are sustained, shall be reimbursed by the company in general. In the Mediterranean, such companies are called *confreres*.

COMPARATIVE ANATOMY

IS that branch of anatomy which considers the secondary objects, or the bodies of other animals; serving for the more accurate distinctions of several parts, and supplying the defect of human subjects.

It is otherwise called the anatomy of beasts, and sometimes zootomy; and stands in contradistinction to human anatomy, or that branch of the art which considers the human body, the primary object of anatomy. See ANATOMY.

INTRODUCTION.

¹ THE principal advantages of comparative anatomy are the following: first, it furnishes us with a sufficient knowledge of the different parts of animals, to prevent our being imposed upon by those authors who have delineated and described several parts from brutes as belonging to the human body. Secondly, it helps us to understand several passages in the ancient writers in medicine, who have taken many of their descriptions from brutes and reasoned from them. The third and great use we reap from this science, is the light it casts on several functions in the human œconomy, about which there have been so many disputes among anatomists.

² In this view it is altogether needless to insist on those parts whose use is easily understood when once their structure is unravelled; thus for instance, if we be acquainted with the action of the muscles in general, it will not be difficult to determine the use of any particular muscle, whose origin and insertion is known, if we at the same time consider the various connections of the bones to which it is fixed, and the different degree of mobility they have with respect to each other: in the same manner if we know the use of the nerves in general, we can easily assign the use

of those nerves which are distributed to any particular part. There is then no occasion for a complete osteology, myology, &c. of the several animals we shall treat of, nor need we trouble ourselves about the structure of any of the parts, unless when it serves to illustrate some of the fore-mentioned purposes.

That the first use we proposed from examining the structure of the parts in brutes is real and of consequence, is evident from looking into the works of some of the earliest and greatest masters of anatomy, who for want of human subjects have often borrowed their descriptions from other animals. The great Vesalius, although he justly reproves Galen for this fault, is guilty of the same himself, as is plain from his delineations of the kidneys, uterus, the muscles of the eye and some other parts. Nor is antiquity only to be charged with this, since in Willis's *Anatomia Cerebri* (the plates of which were revised by that accurate anatomist Dr Lower) there are several of the pictures taken from different brutes, especially the dog, besides those he owns to be such. We shall give several examples of the second use in the sequel of the work.

The animal kingdom, as well as the vegetable, contains the most surprising variety, and the descent in each is so gradual, that the little transitions and deviations are almost imperceptible. The bat and flying-squirrel, though quadrupeds, have wings to buoy themselves up in the air. Some birds inhabit the waters, and there are fishes that have wings, and are not strangers to the airy regions; the amphibious animals blend the terrestrial and aquatic together.

As there is then such a vast variety, it is not only needless but impossible to consider all of them particularly. We shall take only some of the most remarkable genera, and hope from what will be said of them

³ The variety and uniformity observable in nature.

¹ The uses of Comparative Anatomy.

² How the action of muscles is determined.

them, any of the intermediate degrees may be understood.

4
Division of animals into quadrupeds, volatiles, fishes, and insects,

In treating of quadrupeds, we shall divide them into the carnivorous, *i. e.* those that feed indifferently on animal and vegetable substances, and granivorous: as an instance of these last we shall take the ruminant kind. The fowls we shall also divide into those that feed on grain, and those that feed on flesh. The distinction we shall make in treating of fishes, shall be of those that have lungs, and those that have them not. The first indeed are with difficulty procured, and at the same time differ very little from quadrupeds. As the structure of insects is so very minute, and lends us but little assistance for the ends proposed, we purposely omit them.

In inquiring into the structure of different animals, we ought to be previously acquainted with the form of their body, manner of life, kind of food; or in short, with their natural history, which will lead us to account for the reason of their different structure, and thence explain the actions of the human body.

CHAP. I. Of Quadrupeds in general.

ALL quadrupeds have a covering of hair, wool, &c. to defend them from the injuries of the weather, which varies in thickness according to the season of the year, and difference of the climate: thus in Russia and the northern countries, the furs are very thick and warm, while the little Spanish lap-dogs, and Barbary cows, have little or no hair at all.

5
Cuticula, cutis, panniculus carnosus.

The cutis and cuticula in quadrupeds, are disposed much in the same way as the human, only more elastic; immediately under this, there is a very thin cutaneous muscular substance called *panniculus carnosus*, which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, serving to shrivel the skin, in order to drive off insects, their tails and heads not being sufficient for this purpose, while their extremities are employed in their support and progression.

6
Whence the notion of the panniculus carnosus, &c.

It has probably been from observing some muscles of the human body, such as the *platysma myoides*, *cremaster*, and *frontales*, and the collapsed tunica cellulosa of emaciated subjects, to resemble this thin muscle, that some of the older anatomists reckoned such a panniculus among the common teguments of the human body. This Carolus Stephanus has well observed,

7
Why most quadrupeds want clavicles.

Most part of quadrupeds want clavicles, whereby their anterior extremities fall upon their chest, so as to make their thorax proportionally narrower than the human. This small distance of their anterior extremities is very necessary for their uniform progression: apes indeed and squirrels have clavicles to allow them a more full use of their extremities in climbing, but when they sit down on all-four they walk but indifferently.

CHAP. II. The Anatomy of a Dog.

WE may first observe of this animal, as indeed of most quadrupeds, that its legs are much shorter in proportion to its trunk than in man, the length of whose steps depends entirely on the length of his inferior extremities; however, to balance this, the trunk of the animal is proportionally longer and smaller, his spine more flexible, by which he is able at each step to bring his po-

sterior extremities nearer to his anterior. His common teguments are much a-kind to those of other quadrupeds, only they allow little or no passage for sweat, but when he is over-heated the superfluous matter finds an exit by the salivary glands, for he lolls out his tongue and flavers plentifully.

The pyramidal muscles are wanting, to supply which the rectus is inserted fleshy into the os pubis.

The omentum reaches down to the os pubis, which considering the posture of the animal we will find to be a wise provision, since its use is to separate an oily liquor for lubricating the guts and facilitating their peristaltic motion; so in our erect posture the natural gravity of the oil will determine it downward, but in the horizontal position of these creatures, if all the intestines were not covered, there would be no favourable derivation of the fluid to the guts lying in the posterior part of the abdomen, which is the highest; and besides, had the omentum reached much farther down in us, we had been in continual hazard of an epiplocele, which the dog is not subject to as his viscera do not press so much on the rings of the abdominal muscles. The inferior and anterior lamella of the omentum is fixed to the spleen, fundus of the stomach, pylorus, liver, &c. in the same way as the human, but the superior having no colon to pass over, goes directly to the back-bone. This serves to explain the formation of the final omentum in the human body, which is nothing but the large omentum, having lost its fat, passing over the stomach and colon, where it reassumes its pinguedo, so proceeds and is firmly attached to the liver, spine, &c. The triæ of fat are pretty regularly disposed through it, accompanying the distribution of the blood-vessels to guard them from the pressure of the super-incumbent viscera.

This animal's stomach, though pretty much resembling the human in its shape, is somewhat differently situated. It lies more longitudinal, as indeed all the other viscera do to accommodate themselves to the shape of the cavity in which they are contained, that is, its inferior orifice is much farther down with respect to the superior than the human; by this means the gross food has an easier passage into the duodenum. Again, the fundus of the human stomach, when distended, stands almost directly forwards, which is occasioned by the little omentum tying it so close down to the back-bone, &c. at its two orifices, but it not being fixed in that manner in the dog, the fundus remains always posterior: this also answers very well the shape of the different cavities, the distance betwixt the cardia and fundus being greater than that betwixt the two sides. It seems to be much larger in proportion to the bulk of the animal than the human, that it might contain a greater quantity of food at once, which was very necessary, since this animal cannot at any time get its sustenance as men do. The turbilion is not so large, nor is there any coercion forming the antrum Willisii as in the stomach of man. It is considerably thicker and more muscular than ours for breaking the cohesion of their food, which they swallow without sufficient chewing. Hence it is evident the force of the stomach is not so great as some have supposed, nor its contraction so violent; otherwise that of dogs would be undoubtedly wounded by the

[8]
Abdomen, musculi pyram.

8
Ventriculus.

sharp bones, &c. they always take down; for the contraction here is still greater than in the human stomach, which is much thinner. The rugæ of the tunica villosa are neither so large nor situated transversely as in the human, but go from one orifice to the other; the reason of which difference is, perhaps, that they might be in less danger of being hurt by the hard substances this creature frequently feeds upon; and for the same reason there is not the like coercion at their pylorus.

9
Intestines.

The intestines of this animal are proportionally much shorter than ours; for the food which these creatures mostly use, soon dissolves and then putrifies; on which account there was no occasion for a long tract of intestines, but on the contrary that it should be quickly thrown out of the body: the same is to be observed of all the carnivorous animals. The muscular coat of the intestines is also stronger than the human, to protrude the hard bones, lest they should stop somewhere in the canal.

10
Duodenum.

The valvulæ conniventes are less numerous, and in a longitudinal direction.

11
Jejunum.

The duodenum differs considerably in its situation from the human; for in man it first mounts from the pylorus upwards, backwards, and to the right-side, then passes down by the gall-bladder, and marching over the right-kidney and superior part of the psoas muscles, makes a curvature upwards, and passes over the back-bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, mesentery and mesocolon to commence jejunum, being firmly tied down all the way, the biliary and pancreatic ducts entering at its most depending part: whereas in the dog the duodenum is fixed at the pylorus to the concave surface of the liver, and hangs loose and pendulous with the mesentery backwards into the cavity of the abdomen, then turning up again is fixed to the back-bone, where it ends in the jejunum; the bile and pancreatic juice are poured into it at the most depending part; therefore the same intention seems to have been had in view in the formation of this part in both, *viz.* the giving the chyle, after the liquors of the liver and pancreas are poured into it, a disadvantageous course, that so it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous: and this by reason of their different posture, the same design (though by a very different order of the parts), is brought about in both.

12
Intestina tenuia.

The other small guts are much the same with ours, only shorter. The great guts are also shorter and less capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food, have not only their small guts considerably longer, but also their great guts more capacious than such creatures as feed on other animals. Hence man from this form of his intestines and that of the teeth, seems to have been originally designed for feeding on vegetables, and still the most of his food is of that class.

The reason of this difference seems to be, that as animal food is not only much more easily reduced into chyle, but also more prone to putrefaction, too long a remora of the juices might occasion the worst consequences. So it was necessary that their recep-

tacles should not be too capacious, but on the contrary, being short and narrow, might conduce to the seasonable discharge of their contents. Whereas vegetable food being more difficultly dissolved and converted into an animal nature, there was a necessity for such creatures as feed on it to be provided with a long internal canal, that this food in its passage might be considerably retarded, and have time to change its indoles into one more agreeable to our nature. Besides which, there is another advantage which accrues to man in particular, from having his great guts very capacious; for as he is a rational being, and mostly employed in the functions of social life, it would have been very inconvenient, as well as unbecoming for him to be too frequently employed in such ignoble exercises, so that having this large reservoir for his fæces alvine, he can retain them for a considerable time without any trouble.

The appendix vermiformis justly enough deserves the name of an *intestinum cecum* in this subject, though in the human body it does not, and it has probably been from the largeness of this part in other animals, that the oldest anatomists came to reckon that small appendiculus in man as one of the great guts: on its internal surface we observe a great number of mucous glands.

The colon has no longitudinal ligaments, and consequently this gut is not purled up into different bags or cells as the human; nor does this intestine make any circular turn round the abdomen, but passes directly across it to the top of the os sacrum, where it gets the name of rectum.

At the extremity of the *intestinum rectum* or verge of the anus, there are found two bags or pouches which contain a most abominable fetid mucus for which the use is not known, unless it serves to lubricate the strained extremity of the rectum, and defend it against the asperity of the fæces, or to separate some liquor that might otherwise prove hurtful to their bodies. There is nothing analogous to those sacs in the human subject, unless we reckon on the mucilaginous glands that are found most frequent and largest about the lower part of the rectum.

The mesentery is considerably longer than in the human body; for in man had the mesentery been very long, the guts would have fallen down on the stomach, &c. by reason of his erect position. The fat is here disposed in the same way, and for the same reason, as in the omentum. The interstices betwixt the fat are filled with a fine membrane. Instead of a great number of glandular vassæ to be found in the human mesentery, there is only one large gland to be observed in the middle of the mesentery of a dog, which from its imagined resemblance to the pancreas and the name of its discoverers, is called *pancreas asellii*. The reason why this in man is as it were subdivided into many smaller ones, may possibly be, that as the guts of a human body are proportionally much longer than those of this creature, it would have been inconvenient to have gathered all the lactea primi generis into one place, whereas by collecting a few of these vessels into a neighbouring gland the same effect is procured much more easily.

The pancreas in man lies cross the abdomen, tied down

13
Appendix vermiformis.

14
Colon.

15
Rectum.

16
Mesentery.

17
Pancreas asellii.

¹⁸
Pancræs. down by the peritoneum; but the capacity of this creature's abdomen not allowing of that situation, it is disposed more longitudinally, being tied to the duodenum which it accompanies for some way. Its duct enters the duodenum about half an inch below the others.

¹⁹
Spleen. The spleen of this animal differs from ours very much, both in figure and situation. It is much more oblong and thin, and lies more according to the length of the abdomen, like the pancreas. Though the spleen of this creature is not firmly tied to the diaphragm, (which was necessary in our erect posture to hinder it from falling downwards), yet by the animal's prone position, its posterior parts being rather higher than the anterior, it comes to be always contiguous to this muscle, and is as effectually subjected to an alternate pressure from its action as the human spleen is.

²⁰
Liver. The human liver has no fissures or divisions, unless we reckon that small one betwixt the two pylæ, where the large vessels enter: whereas in a dog and all other creatures that have a large flexion in their spine, as lions, leopards, cats, &c. the liver and lungs are divided into a great many lobes by deep sections, reaching the large blood-vessels, which in great motions of the back-bone may easily shuffle over one another, and so are in much less danger of being torn or bruised than if they were formed of one entire piece, as we really see it is in horses, cows, and such creatures as have their back-bone stiff and immoveable. There is here no ligamentum latum connecting the liver to the diaphragm, which in our situation was necessary to keep the viscus in its place; whereas in this creature it naturally gravitates forwards, and by the horizontal position of the animal is in no danger of pressing against the vena cava: the preventing of which is one use generally assigned to this ligament in man. Had the liver of the dog been thus connected to the diaphragm, the respiration must necessarily have suffered; for as we shall see afterwards, this muscle is here moveable at the centre, as well as at the sides: but in man the liver is fixed to the diaphragm, mostly at its tendinous part; that is, where the pericardium is fixed to it on the other side: so that it is in no danger of impeding the respiration, being suspended by the mediastinum and bones of the thorax. In consequence of this viscus being divided into so many lobes, it follows that the hepatic ducts cannot possibly join into one common trunk till they are quite out of the substance of the liver.

²¹
Kidneys. We come next, after having examined the chylipoietic viscera, to discourse of those organs that serve for the secretion and excretion of urine, and first of the kidneys, which in this animal are situated much in the same way as in the human subject, but have no fat on their inferior surface, where they face the abdomen, and are of a more globular form than the human. The reason of these differences will easily appear, if you compare their situation and posture in this animal with those in a man who walks erect. They are placed in this subject in the inferior part of the body, so are not subject to the pressure of the viscera, which seems to be the principal cause of the fatness of those organs in us; and perhaps may likewise be the cause of our being more subject to the stone than

other animals. Hence there is no need of any cellular substance to ward off this pressure where there would necessarily be fat collected; but the superior part of their kidneys is pretty well covered with fat, lest they should suffer any compression from the action of the ribs and spine.

In the internal structure there is still a more considerable difference; for the papillæ don't here send out single the several tubuli uriniferi, but being all united they hang down in form of a loose pendulous flap in the middle of the pelvis, and form a kind of septum medium; so that a dog has a pelvis formed within the substance of the kidney. The only thing that is properly analogous to a pelvis here, is that sac or dilatation of the ureters formed at the union of the ductulæ uriniferæ. The reason of these particularities may probably be, that the liquors of this animal, as of all those of the carnivorous kind, being much more acrid than those that live on vegetable food, its urine must incline much to an alcalescency; as indeed the smell and taste of that liquor in dogs, cats, leopards, &c. evidently shew, being fetid and pungent, and therefore not convenient to be long retained in the body. For this end it was proper, that the secreting organs should have as little impediment as possible by pressure, &c. in the performing their functions; and for that design, the mechanism of their kidneys seems to be excellently adapted: we have most elegant pictures in Eustachius of the kidneys of brutes delineated, as such, with a view to shew Vesalius's error in painting and describing them for the human.

The glandule or capsule atrabiliaræ, are thicker and rounder than the human, for the same reason as the kidneys.

The ureters are more muscular than the human, because of the favourable passage the urine has through them: they enter the bladder near its fundus.

The bladder of urine differs considerably from the human; and first in its form, which is pretty much pyramidal or pyriform: this shape of the dog's bladder is likewise common to all quadrupeds, except the ape and those of an erect posture. In men it is by no means pyriform, but has a large sac at its posterior and inferior part: this form depends entirely on the urine gravitating in our erect posture to its bottom, which it will endeavour to protrude; but as it cannot yield before, being contiguous to the os pubis, it will naturally stretch out where there is the least resistance, that is, at the posterior and lateral parts; and were it not for this sac we could not come at the bladder to extract the stone either by the lesser or lateral operation of lithotomy. Most anatomists have delineated this wrong, so that scarce any have justly painted it, excepting Mr Cowper in his Myotomia, and Mr Rully.

It has certainly been from observing it in brutes, and young children, that they have been led into this mistake. The same cause, viz. the gravity of the urine, makes the bladder of a different form in brutes; in their horizontal position the cervix, from which the urethra is continued, is higher than its fundus, the urine must therefore distend and dilate the most depending part by its weight.

As to its connection, it is fastened to the abdominal muscles by a process of the peritoneum, and that membrane

²²
Papillæ.

²³
Pelvis.

²⁴
Capsulæ atrabiliaræ.

²⁵
Ureters.

²⁶
Vesica urinaria.

²⁷

Connecti-
on.
brance

brane is extended quite over it; whereas in us its superior and posterior parts are only covered by it: hence in man alone the high operation of lithotomy can be performed without hazard of opening the cavity of the abdomen. Had the peritonæum been spread over the bladder in its whole extent, the weight of the viscera in our erect posture would have so bore upon it, that they would not have allowed any considerable quantity of urine to be collected there; but we must have been obliged to discharge its contents too frequently to be consistent with the functions of a social life. Whereas by means of the peritonæum the urine is now collected in sufficient quantity, the viscera not gravitating this way.

It may be taken for a general rule, that those creatures that feed upon animal food have their bladder more muscular and considerably stronger, and less capacious than those that live on vegetables, such as horses, cows, swine, &c. whose bladder of urine is perfectly membranous, and very large. This is wisely adapted to the nature of their food; for in these first, as all their juices are more acrid, so in a particular manner their urine becomes exalted, which as its remora might be of very ill consequence must necessarily be quickly expelled. This is chiefly effected by its stimulating this viscus more strongly to contract, and so discharge its contents. That a stimulus is one of the principal causes of the excretion of urine, we learn from the common saline diuretic medicines that are given, which are dissolved into the serum of the blood, and carried down by the kidneys to the bladder: the same appears likewise from the application of cantharides, or without any of these, when the parts are made more sensible, as in an excoriation of the bladder, there is a frequent desire to make water. Accordingly we find these animals evacuate their urine much more frequently than man, or any other creature that lives on vegetable food. And if these creatures, whose fluids have already a tendency to putrefaction, are exposed to heat or hunger, the liquids must for a considerable time undergo the actions of the containing vessels, and frequently perform the course of the circulation without any new supplies of food; by which the fluids becoming more and more acrid, the creature is apt to fall into feverish and putrid diseases. These causes have been thought sufficient to produce that fatal and melancholy distemper the *rabies canina, vulpina*, &c. in such animals; whereas those that feed on vegetable food seldom or never contract these diseases but by infection. That the causes commonly assigned for the *rabies canina* are insufficient to produce it in dogs and other animals of that kind, is denied in a dissertation on this disease by Dr Heysham. That heat is insufficient, he proves from the disease being totally unknown in South America, where the heat is much greater than in this country. Putrid aliment he also says is taken in great quantity by dogs without any inconvenience; and as it seems in this state to be most agreeable to them, the *rabies canina* cannot with any probability be ascribed to it. As to want of water, he observes that the disease often originates among dogs that are plentifully supplied with that element, while others long deprived of it have remained perfectly free. In short,

Dr Heysham totally denies, not only the efficacy of the causes commonly assigned for the *rabies canina*, but the nature of the distemper itself; and conjectures that the cause of it is not a *putrescency* but an *acidity* of the fluids. See (the *Ind.* x subjoined to) MEDICINE.

The spermatic vessels are much the same way disposed as in us; they are contained within the cavity of the abdomen, as the guts are within the peritonæum, which is spread over them, and from which they have a membrane like a mesentery, so hang loose and pendulous in the abdomen: whereas in us they are contained in the cellular part of the peritonæum, which is tensely stretched over them. At their passage out of the lower belly, there appears a plain perforation or holes; and from observing this in quadrupeds has arisen the false notion of hernia or rupture among authors. This opening is of no disadvantage to them, but evidently would have been to us; for, from the weight of our viscera continually gravitating upon these holes, we must have perpetually laboured under enterocœles; this they are in no hazard of, since in them this passage is at the highest part of their belly, and in their horizontal posture, the viscera cannot bear upon it: and to prevent even the smallest hazard, there is a loose pendulous femilunar flap of fat which serves two uses, as it both hinders the intestines from getting into the passage, and also the course of the fluids from being stopped in the vessels, which is secured in us by the cellular substance and tense peritonæum.

The septum medium, or conjunction of the two tunics, is the same as in men. There is next a passage quite down into the cavity, where the testicles lie. Had the same structure obtained in man, by the constant drilling down of the liquor which is secreted for the lubricating of the guts, we should always have laboured under an hydrocele; but their posture secures them from any hazard of this kind: indeed your very fat lap-dogs, who consequently have an overgrown omentum, are sometimes troubled with an epiplocele.

The scrotum is shorter and not so pendulous as the human, this it has in common with all the dog kind that want the vesiculæ seminales, who have it pretty close tucked up, that the seed at each copulation might the sooner be brought from the testes, thus in some measure supplying the place of the vesiculæ seminales; for the course of the seed through the *vasa deferentia* is thus shortened by placing the secretory vessels nearer the excretory organs. This at the same time explains the reason why this creature is so tedious in copulation.

The structure of the testicles is much the same with the human; as are likewise the corpus pyramidalis varicosum or pampiniforme, and the epididymis or excretory vessel of the testicle; the *vasa deferentia* enter the abdomen where the blood vessels come out, and passing along the upper part of the bladder, are inserted a little below the bulbous part of the urethra.

The præputium has two muscles fixed to it; one that arises from the sphincter ani, and is inserted all along the penis, and this is called *retractor præputii*, but the other, whose office is directly contrary to this, is cutaneous, and seems to take its origin from the muscles of the abdomen, or rather to be a production

28
Why the human bladder but in part covered by the peritonæum.

29
A stimulus proved to be a principal cause of the evacuation of the bladder.

30
Causes assigned for the *rabies canina*, &c.

31
Vasa spermatica.

32
Whence the false notion of hernia or rupture.

33
Scrotum.

34
The vesiculæ seminales, how supplied.

35
Testes.

36
Penis.

of their tunica carnofa. The corpora cavernofa rife much in the fame way as the human; but thefefoon terminate, and the reft is fupplied by a triangular bone, in the inferior part of which there is a groove excavated for lodging the urethra. There are upon the penis two protuberant bulbous flefhy fubftances, at the back of which are two veins, which by the ereftores penis are compreffed in the time of coition, and the circulation being ftopped, the blood diftends the large cavernous bodies: after the penis is thus fwelled, the vagina, by its contraction, gripes it clofely, and fo the male is kept in action fome time contrary to his will; till time be given for bringing a quantity of feed fufficient to impregnate the female; and thus by that orgasmus veneris of the female organs, the want of the veficulae feminales are in fome meafure fupplied. But as it would be a very uneasy pofture for the dog to fupport himfelf folely upon his hinder feet, and for the bitch to fupport the weight of the dog for fo long a time; therefore as foon the bulbous bodies are fufficiently filled, he gets off and turns averfe to her; had then the penis been pliable as in other animals, the urethra muft of neceffity have been compreffed by this twifting, and confequently the courfe of the feed intercepted; but this is wifely provided againft by the urethra's being formed in the hollow of the bone. After the emission of the feed, the parts turn flaccid, the circulation is reftored, and the bulbous parts can be eafily extended.

38
Profrata.

The profrata feems here divided into two, which are proportionally larger than the human, and afford a greater quantity of that liquid.

39
Uterus.

The uterus of multifarious animals is little elfe but a continuation of their vagina, only feparated from it by a fmall ring or valve. From the uterus two long canals mount upon the loins, in which the fœtus's are lodged; thefe are divided into different facs, which are ftrongly conftriated betwixt each facus, yet thefe conftriations give way in the time of birth. From thefe go out the tubæ Fallopiæ; fo that the ovaria come to lodge pretty near the kidneys.

40
Diaphragm

We ought next to examine the ftructure of the thorax and its contents; but firft it may not be amifs to remark of the diaphragm in its natural fituation, that it is in general more loofe and free than the human, which is owing to its connection with the neighbouring parts in a different manner from ours; the human diaphragm is connected to the pericardium, which again by the intervention of the mediastinum is tied to the fternum, spine, &c. but here there is fome diftance between the diaphragm and pericardium. We obferve further that its middle part is much more moveable, and the tendinous parts not fo large. And indeed it was neceffary their diaphragm fhould be fomewhat loofe, they making more ufe of it in difficult refpiration than man. This we may obferve by the ftrong heaving of the flanks of an horfe or dog when out of breath; which corresponds to the rifing of the ribs in us.

41
Thorax.
42
Mammæ.

The difpofition and fituation of the mammæ vary as they bear one or more young. Thofe of the uniparous kind have them placed between the pofterior extremities, which in them is the higheft part of their bodies, whereby their young get at them without the

inconvenience of kneeling; nevertheless, when the creatures are of no great fize, and their breaft large, as in fheep, the young ones are to take this pofture. In multifarious animals they muft have a great number of nipples, that their feveral young ones may have room at the fame time, and thefe difpofed over both thorax and abdomen; and the creatures generally lie down when the young are to be fuckled, that they may give them the moft favourable fituation. From this it does not appear to be from any particular fitnefs of the veffels at certain places, for giving a proper nourifhment to the child, that the breafts are fo placed in women, as we find them, but really from that fituation being the moft convenient, both for mother and infant.

43
Sternum
Coflæ.

The fternum is very narrow, and confifts of a great number of fmall bones, moveable every way, which always happens in creatures that have a great mobility in their fpine. The ribs are freighter and by no means fo convex as the human, whereby in refpiration the motion forward will very little enlarge their thorax, which is compensated by the greater mobility of their diaphragm; fo our thorax is principally enlarged according to its breadth and depth, and theirs according to its length. The want of clavicles, and the confequent falling in of the anterior extremities upon the cheft, may contribute fomewhat to the freightnefs of the ribs.

44
Mediastinum.

The mediastinum in this creature is pretty broad, whereas the human being fo narrow has occafioned a difpute whether there be fuch a thing or not. The pericardium is not here contiguous to the diaphragm, but there is an inch of diftance betwixt them, in which place the fmall lobe of the lungs lodges, and by this means the liver, &c. of this animal, though continually preffing upon the diaphragm, yet cannot difturb the heart's motion.

45
Cor.

The heart is fited with its point almoft directly downwards, according to the creature's pofture, and is but very little inclined to the left fide. Its point is much fharper, and its fhape more conoidal than the human. Here the names of right and left ventricles are proper enough, though not fo in the human, which ought rather to be called anterior and pofterior, or fuperior, and inferior. The animal has the vena cava of a confiderable length within the thorax, having near the whole length of the heart to run over ere it gets at the finus lowerianus dexter. In men, as foon as it pierces the diaphragm, fo foon it enters the pericardium, which is firmly attached to it, and immediately gets into the finus Lowerianus; which finus in the human fubject, by the oblique fituation of the heart, is almoft contiguous to the diaphragm, and by this we difcover that feveral authors have taken their delineations of the human heart from brutes, which is eafily detected by the fhape and fituation of the heart, and long vena cava within the thorax.

46
Vena Cava.

This fituation of the heart of the creature agrees beft with the fhape of its thorax, which is lower than the abdomen.

47
Aorta afcendens improperly fo called.

The egress of the large blood-vessels from the heart is fomewhat different from the human, for here the left fubclavian comes off firft, and then a large trunk runs fome way upwards before it gives off the left carotid,

carotid, and splits into the carotid and subclavian of the right side : so that neither here, properly speaking, is there an aorta ascendens, more than in the human ; but this name has probably been imposed upon it from observing this in a cow, where indeed there is an ascending and descending aorta.

From this speciality of the distribution of the vessels of the right side, which happens, though not to so great a degree, in the human subject, we may perhaps in some measure account for the general greater strength, readiness or faculty of motion which is observable in the right arm. Upon measuring the sides of the vessels, the surface of the united trunk of the right subclavian and carotid is less than that of the left subclavian and carotid, as they are separated ; if so, the resistance to the blood must be less in that common trunk than in the left subclavian and carotid ; but if the resistance be smaller, the absolute force with which the blood is sent from the heart being equal, there must necessarily be a greater quantity of blood sent through them in a given time : and as the strength of the muscles is, *cæteris paribus*, as the quantity of blood sent into them in a given time, those of the right arm will be stronger than those of the left. Now, children being conscious of this superior strength, use the right upon all occasions ; and thus from use comes that great difference which is so observable. That this is a sufficient cause seems evident from fact ; for what a difference is there betwixt the right and the left arm of one, who has played much at tennis ? View but the arms of a blacksmith, and legs of a footman, and you'll soon be convinced of this effect arising from using them. But if by any accident the right arm is kept from action for some time, the other from being used gets the better, and those people are left-handed : for it is not to be imagined that the small odds in the original formation of the vessels should be sufficient to resist the effect of use and habit, (instances of the contrary occur every day) ; 'tis enough for our present argument, that where no means are used to oppose it, the odds are sufficient to determine the choice in favour of the right. Now because it is natural to begin with the leg corresponding to the hand we have most power of, this is what gives also a superiority to the right leg.

This difference is not peculiar to man, but is still more observable in those creatures, in whom the same mechanism does obtain in a greater degree. Do but observe a dog at a trot, how he bears forwards with his right side ; or look at him when a-scraping up any thing, and you will presently see that he uses his right much oftner than he does his left foot. Something analogous to this may be observed in horses.

The thymus of this creature is proportionably much larger than ours, whereas the glandula thyroidea is much less, and it is generally remarked that these two glands do thus always supply the place of each other : that is, in such animals as have a large thymus ; the glandula thyroidea is smaller, and *vice versa*. Hence we are naturally led to ascribe the same use to both, *viz.* the separation of a thin lymph for diluting the chyle in the thoracic duct, before it be poured into the blood ; then if we consider the different formation of the thorax in both, we shall readily account for the

variety in the bulk of these two glands. Respiration being chiefly performed in man by the widening of the chest, the lungs at every inspiration must press upon the thymus, and consequently diminish it ; but the diaphragm yielding more in the dog's inspiration, this gland is not so much pressed by the lungs and so will be larger, and hence the glandula thyroidea will be proportionably less : again, from the posture of this creature, we shall see that it was much more convenient for a dog to have the most part of the diluting lymph supplied by the thymus, since the neck being frequently in a descending posture, the lymph of the thyroid gland would have a very disadvantageous course to get to the thoracic duct : whereas in the human body, the thymus is really below the lacteal canal, where it makes its curvature before it opens into the subclavian, and consequently there is a necessity of a considerable share of the diluting liquor being furnished by the thyroid gland, which is situated much higher, so that its lymph has the advantage of a perpendicular descent.

We may here observe that the thoracic duct in a dog has no curvature before it enters the subclavian vein. The horizontal position of this animal allowing a favourable enough course to the chyle, so as not to need that turn to force its passage into the blood. The lungs of this creature are divided into more numerous lobes and deeper than they are in man, for the same reason as the liver. The left side of the thorax in this animal bears a greater proportion to the right than in man, the one being nearly as three to two, the other as four to three.

We look on it as a general rule, that all quadrupeds, as having occasion to gather their food from the ground, are provided with longer necks than man ; but as a long neck not only gives the advantage of too long a lever to the weight of the head, but also when the animal is gathering his food, makes the brain in danger of being oppressed with too great a quantity of blood, by the liquor in these arteries having the advantage of a descent, while that in the veins must remount a considerable way contrary to its own gravity ; it was therefore necessary that a part of the length of the neck should be supplied by the length of the jaws. Thus we see horses, cows, &c. who have no occasion for opening their mouths very wide, yet have long jaws. Bull dogs indeed, and such animals as have occasion for very strong jaws, must of necessity have them short ; because the longer they are, the resistance to be overcome acts with a longer lever. Another exception to this general rule, is, such animals as are furnished with something analogous to hands to convey their food to their mouths, as cats, apes, &c. The teeth of this creature plainly shew it to be of the carnivorous kind, for there are none of them made for grinding their food, but only for tearing and dividing it. Even its posterior teeth are not formed with rough broad surfaces as ours are ; but are made considerably sharper, and press over one another when the mouth is shut ; that so they may take the firmer hold of whatever comes betwixt them.

The tongue in consequence of the length of the jaws, is much longer than ours ; and as this creature feeds with his head in a depending posture, the bolus would

48
A mechanical
account of
the su-
perior
strength of
the right
arm, leg,
&c.

51
Ductus
thoracicus.

52
Neck.

53
Jaws.

54
Teeth.

55
Tongue.

49
Thymus.
50
Glandula
thyroidea.

would always be in danger of falling out of the mouth, were it not for several prominences placed mostly at the root of the tongue, and crooked backwards in such a manner as to allow any thing to press easily down to the jaws; but to hinder its return. In some animals who feed on living creatures, these under hooks are still more conspicuous; as in several large fishes, where they are almost as large as their teeth in the forepart of their mouth, and near as firm and strong.

56
Amygdals. When we open the mouth, we see the amygdals very prominent in the posterior part of it; so that it would appear at first view, that these were inconveniently placed, as being continually exposed to injuries from the hard substances this creature swallows; but upon a more narrow scrutiny we find this provided for by two membranous capsulæ, into which the amygdals, when pressed, can escape and remove themselves from such injuries.

57
Velum pendulum palati. The velum pendulum palati, is in this creature considerably longer than in man, to prevent the food from getting into his nose; which would happen more frequently in this animal than in man, because of its situation while feeding.

58
Glottis. In this subject there is no uvula; but then the epiglottis, when pressed down, covers the whole rima entirely, and naturally continues so; there is therefore a ligament, or rather muscle, that comes from the os hyoides and root of the tongue, that is inserted into that part of the epiglottis where it is articulated with the cricoid cartilage, which serves to raise it from the rima, though not so strongly but that it may with a small force be clapt down again. If then in all such animals as have no uvula, the epiglottis is so ordered as to be capable of covering the rima entirely, and if in man the epiglottis cannot be so pressed backwards and downwards, as to shut up the glottis perfectly, but leaves a space that can be exactly filled up by the uvula, we may very reasonably conclude that the use of this part is to supply this deficiency in the epiglottis.

60
The use of the uvula in man. In the upper part of the pharynx, behind the cricoid cartilage, there is a pretty large gland to be found, which serves not only for the separation of a mucous liquor to lubricate the bolus as it passes this way, but also supplies the place of a valve, to hinder the food from regurgitating into the mouth, which it would be apt to do by reason of the descending situation of the creature's head.

61
Œsophagus. The œsophagus is formed pretty much in the same way as the human; authors indeed generally alledge, that quadrupeds have their gullet composed of a double row of spiral fibres decussing one another; but this is proper to ruminating animals, who have occasion for such a decussation of fibres. The action of these may easily be observed in a cow chewing her cud.

62
Organ of smell. The nose is generally longer than in man, and its external passage much narrower. The internal structure is also better adapted for an acute smelling, having a larger convoluted surface on which the membrana Scheideriana is spread, and this is to be observed in most quadrupeds, who have the ossa spongiosa commonly large, and these too divided into a great number of excessively fine thin lamellæ. The ele-

phant, which has a head pretty large in proportion to its body, has the greatest part of it taken up with the cavity of the nose and frontal sinusses, which last extend almost over their whole head, and leaves but a small cavity for their brains. A very nice sense of smelling was not so absolutely necessary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes, who have only their senses, must have these of necessity acute, some having one sense in greater perfection than others, according to their different way of life. We not only conclude *a priori* from the large expanded membrana Scheideriana that their sense of smelling is very acute, but we find it so by cows, and horses, distinguishing so readily betwixt noxious and wholesome herbs, which they do principally by this sense.

The external ear in different quadrupeds is differently framed, but always calculated to the creature's manner of life: in shape it commonly resembles the oblique section of a cone from near the apex to the basis. Hares and such other animals as are daily exposed to insults from beasts of prey, have large ears directed backwards, their eyes warning them of any danger before; rapacious animals, on the other hand, have their ears placed directly forwards, as we see in the lion, cat, &c. The slow hounds and other animals that are designed to hear most distinctly the sounds coming from below, have their ears hanging downwards. Man again, who must equally hear sounds coming from all quarters, but especially such as are sent from about his own height, has his external ear placed in a vertical manner, somewhat turned forward. In short, where-ever we see a speciality in the make of this organ in any creature, we shall with very little reflection discover this form to be more convenient for that creature than another. There are some differences to be observed in the structure of the internal ear, in different animals; but we know so very little of the use of the particular parts of that organ in the human subject, that it is altogether impossible to assign reasons for these variations in other creatures.

All quadrupeds have at the internal canthus of the eye, a strong firm membrane with a cartilaginous edge, which may be made to cover some part of their eye, and this is greater or less in different animals, as their eyes are more or less exposed to dangers in searching after their food: this *membrana nictitans*, as it is called, is not very large in this animal; cows and horses have it so large as to cover one half of the eye like a curtain, and at the same time is transparent enough to allow abundance of the rays of light to pass through it; fishes have a cuticle always over their eyes, as they are ever in danger in that inconstant element. In this then we may also observe a sort of gradation.

All quadrupeds have a seventh muscle belonging to the eye, called *suspensorius*. It surrounds almost the whole optic nerve, and is fixed into the sclerotic coat as the others are; its use is to sustain the weight of the globe of the eye, and prevent the optic nerve being too much stretched, without obliging the four straight muscles to be in a continual contraction, which would be inconvenient. At the same time this muscle

63
Auris.64
Membrana nictitans.65
Musculus suspensorius.

66
Pupilla.

may be brought to assist any of the other four, by causing one particular portion of it to act at a time.

The next thing to be remarked, is the figure of the pupil, which is different in different animals, but always exactly accommodated to the creature's way of life. Man has it circular for obvious reasons; an ox has it transverse, to take in a larger view of his food; cats again have theirs somewhat perpendicular, (but can alter it pretty much) for a similar reason, and so of the rest: the pupil of different animals varies in wideness according as the internal organs of vision are more or less acute; thus cats and owls who seek their prey in the night, or in dark places (and consequently must have their eyes so formed as that a few rays of light may make a lively impression on the retina) have their pupils in day-time contracted into a very narrow space, as a great number of rays would oppress their nice organs, while in the night they dilate considerably. In the same way when the retina is inflamed, a great number of rays of light would occasion a painful sensation, therefore the pupil is contracted; on the contrary in dying people, or in a beginning amaurosis it is greatly dilated, as the eyes on such occasions are very difficultly affected, and as it were insensible.

67
Tapetum.

The posterior part of the choroid coat, which is called *tapetum*, is of different colours in different creatures. Or oxen feeding mostly on grass have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are obscured: thus the animal sees its food better than other objects. Cats and owls have their tapetum of a whitish colour, and for the same reasons have the pupil very dilatible, and their organs of vision acute; and we shall find that all animals see more or less distinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs who have it of a greyish colour distinguish objects better in the night than man, whose tapetum is dark brown, and who we believe sees worst in the dark of any creature: it being originally designed that he should rest from all kinds of employments in the night-time. The difference then of the colour of the tapetum, as indeed the fabric of any other part in different creatures, always depends on some particular advantage accruing to the animal in its peculiar manner of life from this singularity.

68
Cerebrum.

We shall now proceed to the brain, which we remark in the first place is proportionally much smaller in all quadrupeds than the human. The reason of which may be, that as those creatures for the most part seek their food with their heads in a depending posture, this situation would make it very inconvenient for the brain itself to send its animal spirits, (or its influence and energy, let that be what it will) through the nerves, so that it was necessary they should be supplied from somewhere else; and consequently there was no reason for the brain itself being of a great bulk. As a confirmation of this theory, we find that the intercostal and eight pair of nerves, which serve the vital organs in the human body, take their origin from the encephalon, which in quadrupeds come mostly from the *theca vertebrae*. Again there was no such occasion for so great a quantity of brains in those animals as in man; seeing in them all its energy is em-

ployed in their progression, while man has a great waste of spirits in the exercise of his reason and intellectual faculties. And besides all this, a great bulky brain would be inconvenient to these creatures, in so far as it would add considerably to the weight of the head, which having the advantage of a long lever to act with, would require a much greater force to support it, than now it does; for the heads of the greatest part of quadrupeds are not near so heavy as they would at first seem to be, from the *sinus frontales* being produced a great way upwards to enlarge the organs of smelling.

The pits in the anterior part of their skulls are much more conspicuous than in the human *cranium*, which may be occasioned by the depending posture of these creatures heads, while they gather their food: the brain at this time gravitating much on the bones while they are as yet soft, will gradually make impressions upon them at these places where it rises into eminences. This is prevented in man mostly by his erect posture.

The falx is not near so large in quadrupeds as in man, as they have little occasion to be on either side; and the two hemispheres of the brain are in a great measure hindered from jutting against one another in violent motions, by the brain's insinuating itself into the above-mentioned pits.

The second process of the *dura mater*, or *tentorium cerebelli superexpansum* is considerably thicker and stronger in most quadrupeds than in man, especially in such of them as are very swift of foot, as hares and rabbits, and that most when they are old. This membrane is generally ossified, that it may the more effectually keep off the weight of the superincumbent brain from the *cerebellum* in their rapid motions, which otherwise would be of bad consequence.

The olfactory nerves are very large, and justly deserve the name of *processus mammillaris*. They are hollow, and consist of a medullary and cineritious substance; and at first sight appear to be anterior ventricles of the brain produced; but in man they are small, and without any discernable cavity. The reason of this is pretty evident, if we consider how this animal's head is situated; for the lymph continually gravitating upon the inferior part of the ventricles may thus elongate and produce them: but from this very inferior part the olfactory nerves rise, and are sent immediately through the os ethmoides into the nose. Hence the ancients thinking they were continued hollow into the nose, believed they were the emanatories of the brain. In the brain of sheep, which by its firm texture is the best subject of any for searching into the structure of this part, we evidently see, that the name of the sigmoid cavities was very properly applied by the ancients to the lateral ventricles of the brain, which are really of a greater extent than they are ordinarily painted by the anatomists, reaching farther backwards and forwards again under the substance of the brain.

The nates and testes deserve this name much better here than in the human body with respect to each other. They are here also of different colours, the nates being of the colour of the cortical, and the testes of the medullary substance of the brain: whereas in man they are both of one colour. The reason of these differences,

69
Falx.

70
Processus
mammillaris.

71
Nates.
Testes.

differences, and others of the like nature to be met with, we shall not pretend to determine; for we have hitherto such an imperfect knowledge of the brain itself, that we are entirely ignorant of the various uses of its different parts; we may in general conclude, that the varying in one animal, from what it is in another, is fitted to the creature's particular way of living.

72 The rete mirabile Galeni, situated on each side of the fella turcica, about which there has been so much dispute, is more remarkable in quadrupeds than in the human subject, though it is certainly to be found there too; notwithstanding several anatomists have denied its existence. The use indeed which Galen ascribes to it is frivolous, and not well grounded; for he will have this plexus of vessels serve for checking the impetuosity of the blood in the brain; but it is evident this cannot be the use of it; if indeed the whole carotid artery had split into such small vessels as compose this network, the motion of the blood would certainly have been retarded in it; but this is not the case, for it only sends off a few small twigs to compose the plexus at its entry into the cranium; and the branches going out from this same plexus, are distributed to the neighbouring nerves: among the rest it gives some twigs to the ophthalmic branch of the fifth pair. It is this distribution of these arteries makes it so difficult to determine whether there is a communication between the intercostal and that nerve; for if you dissect the parts in a recent subject, you would at first view affirm, that there is an anastomosis; but when the carotid artery is injected, and the plexus filled with the fistule liquor, these branches, which formerly seemed to be nerves, have now the appearance of arteries by the vessels of their coats being injected.

The structure of the brain differing but very little in all quadrupeds, it will be needless to examine it in any other.

73 Chap. III. The Anatomy of a Cow.

The next species of quadrupeds we proposed to consider was the ruminant kind, of which we have an example in a cow; and accordingly shall take the fœtus of the animal in utero, that we may first remark some things that are peculiar to it in that state, and afterwards proceed to examine its viscera as a ruminant animal; first then as a fœtus.

74 The form of a cow's uterus differs from the human, in having two pretty large cornua. This is common to it with other brutes; for a bitch has two long cornua uteri; but these again differ (as being multiparous and uniparous) in this, that in the bitch's cornua the fœtuses are contained, whereas here there is only part of the secundines, being mostly the allantois with the included liquor. The muscular fibres of the uterus are more easily discovered; its internal surface has a great number of spongy, oblong, protuberant, glandular bodies fixed to it by a fine membrane: these are composed of the several large vessels of the uterus terminating here. These are very small, and sometimes not to be observed at all. In an impregnated uterus, we can easily press out of them a chylous mucilaginous liquor; they are composed of a great many processes or digituli, and deep caverns answering to as many processes and caverns of the placenta. Their resemblance

has occasioned the name of *Papillæ* to be given them; and hence it was that Hippocrates was induced to believe, that the fœtus sucked in utero. It is not easy to determine, whether the uterus grows thicker or thinner in the time of gestation. The membranes it is plain (by the stretching of the parts) must be made thinner; but then it is as evident, that the vessels are at that time enlarged, upon which principally the thickness of any part depends; so there seems to be as much gained the one way, as lost the other. The os uteri is entirely shut up by a glutinous mucilaginous substance, that is common to the females of all creatures when with young; by this the external air is excluded, which would soon make the liquors corrupt, it also prevents the inflammation of the membranes, and the hazard of abortion. By this means also the lips of the womb are kept from growing together, which otherwise they would certainly at this time do. There are mucous glands placed here to screen this gluten, which on the breaking of the membranes with the contained waters make a sapo that lubricates and washes the parts, and makes them easily yield. The first of the proper involucria of the fœtus is the chorion.

The chorion is a pretty strong firm membrane, on whose external surface are dispersed a great many red fleshy bodies of the same number, size and structure with the papillæ, with which they are mutually indented. They have been called *Golyedones* from *κολλη* cavity. This is greatly disputed by some as a name very improper, but without reason, since the surface that is connected to the papillæ is concave, though when separated it appears rather convex. To shun all dispute, they may be called properly enough *Placentule*, since they serve the same use as the placenta in women. The separation of these from the papillæ without any dilaceration seems to prove beyond a reply, that there can be here no anastomoses betwixt the vessels; on their coats run a great number of vessels, that are sent to the several placentulæ, on the external side next to the uterus; whereas in creatures that have but one placenta, as in the human subject, cats, dogs, &c. the adhesion is somewhat firmer: the placenta are likewise joined to the papillæ in the cornua uteri. We shall next give the history of the allantois.

75 The is a fine transparent membrane contiguous to the former. It is not a general involucrum of the fœtus in the mother; for it covers only a small part of the amnios: it is mostly lodged in the cornua uteri. In mares, bitches and cats, it surrounds the amnios, being every where interposed betwixt it and the chorion. In sheep and goats it is the same as in this animal; and in swine and rabbits it covers still less of the amnios. This fac is probably formed by the dilation of the urachus, which is connected at its other end to the fundus of the bladder, through which it receives its contents; and the membrane is doubled at the extremity of the canal to hinder the return of the urine back into the bladder. Its vessels are excessively fine and few, and we cannot force an injected liquor farther than the beginning of this coat. This membrane is so far analogous to the cuticula, as not to be liable to corruption, or easily irritated by acrid liquors. The existence of this membrane in women has

76 Uterus if thicker in time of gestation.

77 Chorion

78 Cotyledones.

79 Allantois.

72 rete mirabile Galeni.

74 Uterus.

75 cornua uteri.

83
The arguments for and against the human allantoidis.

has been very warmly disputed on both sides : those who are against its existence deny they could ever find it, and allowing it were so, allege, that since the urachus is impervious, as appears by our not being able to throw liquors from the bladder into it, or *vice versa*, it cannot serve the use, that is agreed by all it does serve in beasts, and therefore in the human body there is no such thing : but if we consider on the other hand, that first there seems to be the same necessity for such a reservoir in man, as in other animals. Secondly, That we actually find urine contained in the bladder of the human fœtus. Thirdly, That urine has been evacuated at the navel when the urethra was stopped, which urine without this conduit would have fallen into the cavity of the abdomen. Fourthly, That midwives do generally remark two different sorts of waters come away at the time of birth ; and lastly, That Dr Littré and Dr Hale have given in this membrane of an human subject, with all the other secundines curiously prepared, the one to the Royal Academy at Paris, the other to the Royal Society at London, by which societies their respective accounts are attested ; not to mention Verheyen, Heister, Keil, &c. who affirm their having seen it ; and Mr Albinus, that famous anatomist, professor at Leyden, is said to have shewn to his college every year a preparation of it. On all these accounts, it seems most probable, that there is such a membrane in the human body.

84
Amnios.

The third proper integument of the fœtus is the amnios ; it is thinner and firmer than the chorion ; it has numerous ramifications of the umbilical vessels spread upon it, the lateral branches of which separate a liquor into its cavity. This is the proper liquor of the amnios, which at first is in a small quantity, afterwards encreases for some months, then again decreases ; and in a cow near her time, the quantity of this liquor is not above a pound. This membrane does not enter the cornua uteri in this creature.

There are here two venæ umbilicales, but one in the human subject ; because the extreme branches coming from the several placentulæ could not unite, so soon, as they would have done, had they come all from one cake as in the human.

There is a small round fleshy body that swims in the urine of this creature, mares, &c. called *cuticula*, which is the hypomenes of the ancients. Several idle opinions and whims have been entertained as to its use ; but that seems to be still unknown, or how it is generated or nourished ; for it has no connection with the fœtus or placentule.

Having thus considered the several involucri of this animal in a fœtus state, let us next observe the specialities in its internal structure peculiar to a fœtus.

85
Vena umbilicalis.

The umbilical vein joins the vena portarum in the capsula glissoniana without sending off any branches as it does in the human subject. This vein soon after birth turns to a ligament, yet there are some instances where it has remained pervious for several years after birth, and occasioned an hemorrhage. We may next observe the duct called *canalis venosus*, going straight from the capsula glissoniana to the vena cava ; this turns also afterwards to a ligament. The umbilical arteries rise at acute angles from the internal iliacks,

whatever some may say to the contrary : these also become impervious.

The pulmonary artery coming from the right ventricle of the heart divides into two, the smallest called *canalis arteriosus* opens into the descending aorta ; the other divides into two, to serve the lung on each side. The foramen ovale is placed in the partition betwixt the right and left auricles. At the edge of this hole is fixed a membrane, which when much stretched will cover it all over, but more easily yields to a force that acts from the right auricle to the left, than from the left to the right. After what has been said, we may easily understand how the circulation is performed in a fœtus. The blood being brought from the placenta of the mother, is thrown into the capsula glissoniana, where it is intimately blended with the blood in the vena portarum : then part of this blood goes directly into the vena cava by the ductus venosus, the rest passes through the liver. First then the whole is sent from the vena cava into the right auricle, from whence part of it is sent by the foramen ovale into the left auricle ; the rest passes into the right ventricle ; then into the pulmonary artery ; then the greatest share it receives is sent immediately into the descending aorta by the canalis arteriosus ; and the remainder circulates through the lungs, and is sent back by the pulmonary veins into the left auricle ; which, with the blood brought there by the foramen ovale is sent into the left ventricle, from whence it is driven by the aorta through the body. The great design of this mechanism is, that the whole mass of blood might not pass through the collapsed lungs of the fœtus, but that part of it might pass through the foramen ovale and canalis arteriosus without circulating at all through the lungs.

This was the opinion that universally prevailed till the end of the last century, when it was violently opposed by Monsieur Mery, who is very singular in several of his opinions. He will not allow that the foramen ovale transmits blood from the right to the left auricle, but on the contrary from the left to the right ; and that for no other reason but because he observed the pulmonary artery in a fœtus longer than the aorta : Mr Winslow endeavours to reconcile these two opinions, by saying the blood may pass either way, and that it is here as it were blended ; his reason is, that on putting the heart in water, the foramen ovale transmits it any way. Mr Robault, professor of anatomy at Turin, and formerly one of Mery's scholars, strongly defends his master and criticises Mr Winslow. What he principally builds on is the appearance this foramen has in some dried preparations : this Mr Winslow won't allow as a proof. After all, the common opinion seems most probable ; and that for the following reasons : first the pulmonary artery being larger signifies nothing, since its coats are not only thinner, and will be more easily distended, but also the resistance to the blood in the pulmonary artery from the collapsed lungs is greater than the resistance to the blood in the aorta. Secondly, if we should allow any of these two uncommon opinions, we should have the right ventricle vastly more capacious than the left ; for if we suppose the foramen ovale to be capable of transmitting one half of the whole mass of blood in any given time, and the arteriosus as much in the

84
Foramen ovale.

85
The circulation, how performed in a fœtus.

86
Messieurs Mery and Winslow, their opinions of examined.

87
Canalis venosus.

the same time; then, according to Mr Mery's opinion, the whole mass of blood being driven from the right ventricle into the pulmonary artery, one third passes by the canalis arteriosus into the descending aorta; two thirds passing through the lungs and returning into the left auricle, one half of it, or one third of the whole mass passes by the foramen ovale into the right auricle, and the other or the last third will be sent into the left ventricle, and thence expelled into the aorta; which third, with that from the pulmonary artery by the canalis arteriosus, circulating through the body, are returned into the right auricle, where meeting with the other third from the foramen ovale, with it are sent into the right ventricle to undergo the same course. Thus the whole mass is expelled by the right ventricle, and only one third by the left. If this was the case, why is not the right ventricle three times as large and strong as the left? Then, if according to Mr Winflow's system, the foramen ovale transmits equal quantities from both auricles, this comes to the same, as if there was no foramen ovale at all; that is to say, the whole mass going from the right auricle into the right ventricle and pulmonary artery, one third of the whole mass passes into the aorta through the canalis arteriosus, the other two thirds passing through the lungs, return to the left ventricle and auricle, to be sent through the canalis arteriosus to the right ventricle to undergo the same fate; thus the right ventricle expels the whole mass, the left only one third; but if according to the common opinion we suppose the foramen ovale to convey the blood from the right to the left auricle; then one third passes this way into the left ventricle, the other two thirds are sent by the right ventricle into the pulmonary artery, from whence one third passes by the canalis arteriosus into the aorta descendens, the other third circulates through the lungs and is returned into the left ventricle, where meeting with that from the foramen ovale, is with it expelled into the aorta; and with the one third transmitted by the canalis arteriosus returns into the auricle to run the same race as before. Thus we conclude that two thirds are expelled by each ventricle, and the whole circulates through the body; and hence they come to be of pretty equal dimensions. In all this calculation we have had no regard to the blood discharged from the umbilical vessels; but the greater quantity returned by the veins than sent out by the arteries still argues for the common opinion.

87
The kidneys.

The kidneys in the fœtus are composed of different lobes, which serves to give us an idea of the kidneys being a congeries of different glands; these lobes being kept contiguous by the external membrane are pressed by the other viscera till at length they unite.

88
The history of it as a ruminant animal.

We come now to consider the creature as a ruminant animal. There are no dentes incisores in the upper jaw, but the gums are pretty hard, their tongue rough; and they supply this defect by wrapping their tongue round a tuft of grass, or pressing it against the upper-jaw keep it stretched, and cut it with the teeth of the under-jaw; then, without chewing, throw it down into the œsophagus, which in these creatures consists of a double row of spiral fibres decussating one another. All animals which ruminate must have more

ventricles than one; some have two, some three; our present subject has no less than four. The food is carried directly down into the first, which lies upon the left-side and is the largest of all; it is called *ventriculus*, and *καλὴ* by way of eminence. It is what is called by the general name of paunch by the vulgar. There are no rugæ upon its internal surface; the food, by the force of its muscular coat, and the liquors poured in here, is sufficiently macerated, after which it is forced up hence by the œsophagus into the mouth; and there it is made very small by mastication; this is what is properly called chewing the cud, or rumination; after this it is sent down by the gullet into the second, for the œsophagus opens indifferently into both; however the creature has a power to direct it into which it will. Some tell us that the drink goes into the second; but that might be easily determined by making them drink before slaughter; the second stomach, which is the anterior and smallest, is called *κεντροφάδος reticulum*, the *bonnet* or *king's hood*. It consists of a great number of cells on its internal surface of a regular pentagonal figure, like to a honeycomb. Here the food is farther macerated, from which it is protruded into the third, called *exuvios* or *omasum*, *vulgo* the *manypilus*; because the internal surface rises up into a great many plizæ or folds, and *stratum super stratum*, according to the length of this stomach. Some of these plizæ are further produced into the stomach than others, *i. e.* first two long ones on each side, and within these, two shorter in the middle, &c. There are several glands in this stomach which is next to the *καλὴ* in bigness, and from this it passes into the fourth, whose names are *νοστρον*, *abomasium*, *caille*, or the *red*, which is the name it commonly has because of its colour. Caille signifies curdled; and hence the French have given that as a name to this fourth stomach; because any milk that is taken down by young calves from the long remora it makes here, turns acid; and by the remains of the milk before taken down, assisting, it is curdled. It is this fourth stomach with the milk curdled in it, that is commonly taken for earning of milk; (as they call it), but after the bile and pancreatic juice enter, this coagulation is not to be found, which shews the use of these liquors. There are other creatures that use the same food, that have not such a mechanism in their digestive organs; horses asses, &c. have but one stomach where grass is macerated, and a liquor for their nourishment extracted, and the remainder sent out by the anus very little altered. From this different structure of the stomach in these creatures, a ruminant animal will be served with one third less food than another of equal bulk; grassers are sufficiently acquainted with this. The reason is, that ruminating animals have many and strong digestive organs; all their food is fully prepared and almost converted into chyle; but a horse's stomach is not fitted for this, so that they require a much greater quantity of food to extract the same nourishment.

91
Intestina.

The guts of these creatures are of a considerable length in proportion to the bulk of the animal's body; and this confirms what we said formerly on the subject of the intestines of a dog, *viz.* that the length and capacity of the guts were different in different animals according to the nature of their food.

⁹²
Duodenum. The duodenum is formed here much the same way as in a dog, and the general intention kept in view; with regard to the mixture of the bile and pancreatic lymph. The great guts here hardly deserve that name, their diameter differing very little from that of the small ones; but to compensate this, they are much longer proportionally than a dog's are, being convoluted in the same way as the small guts are. The cæcum is very large.

⁹³
Spleen. The spleen differs not much either in figure or situation from that of a dog's; but it is a little more firmly fixed to the diaphragm, there not being here so much danger of this viscus being hurt in the flexions of the spine.

⁹⁴
Liver. The liver is not split into so many lobes in this creature as either in a man or dog, which depends on the small motion this creature enjoys in its spine, which made such a division needless.

⁹⁵
Bladder. Their vesica urinaria is of a pyramidal shape, and has scarce any muscular fibres. It is very large and membranaceous; for the urine of these creatures not being so acrid as that of carnivorous animals, there was no such occasion for expelling it so soon.

⁹⁶
Scrotum. Vesiculæ feminales. This creature is provided with a loose pendulous scrotum, and consequently with vesiculæ feminales. The female organs differ from those of a bitch, mostly as to the form of the cornua uteri, which are here converted in form of a snail. In this and all uniparous animals they contain only part of the fecundines; but in bitches and other multiparous animals they run straight up in the abdomen, and contain the fœtus themselves.

⁹⁷
Cor. The situation of the heart is pretty much the same with that of a dog, only its point is rather sharper; in us the heart beating continually against the ribs, and both ventricles going equally far down to the constitution of the apex it is very obtuse; but here the apex is made up only of the left ventricle, so is more acute.

⁹⁸
Aorta ascendens and descendens. The aorta in this creature is justly divided into ascending and descending, though this division is ill founded either in a dog or man; and it has certainly been from this subject that the older anatomists took

their descriptions when they made this division; for here the aorta divides into two, the ascending and descending: the descending runs upwards or forwards, according to their posture, for two or three inches, before it gives off the left subclavian; and still an inch or more before the right subclavian comes off, and yet somewhat further before it divides into the two carotids; so that the vessels that go to the anterior extremity of the right side, do still keep longer in a common trunk with the carotids than those on the left.

CHAP. IV. Of Fowls in general.

99

THE next class of animals we come to consider, are the feathered kind; which are divided into the granivorous and carnivorous. But before we go on to consider the specialties in the viscera of each kind, we must observe what both species agree in.

Fowls have a particular covering of feathers different from all other creatures, but exactly well suited to their manner of life; for it not only protects them from the injuries of the weather, but serves them in their progression through that thin aerial element, they are for the most part employed in; and as some fowls live much in the water, their feathers being continually besmeared with an oily liquor, keeps the water from soaking into their skins, and so prevents the bad effects which it would infallibly otherways produce.

Fowls have the strongest muscles in their whole body inserted into their wings; whence by the way we may observe, that it is altogether impossible for man to buoy himself up into the air like birds, even though he had proper machines in place of wings, unless he were likewise provided with muscles strong enough for moving them, which he has not.

In the next place, their wings are not placed in the middle of their bodies, but a good deal further forwards; whence it would at first view appear that their heads would be erect, and their posterior parts most depending, when raised in the air: but by stretching out their heads, which act upon the lever of a long neck, they alter their centre of gravity pretty much, and also by filling the sacs * or bladders in the inside of their

* Dr Hunter hath lately made some curious discoveries relative to these internal receptacles of air in the bodies of birds. Some of them are lodged in the fleshy parts, and some in the hollow bones; but all of them communicate with the lungs. He informs us, that the air-cells which are found in the soft parts have no communication with the cellular membrane which is common to birds as well as other animals. Some of them communicate immediately with each other, but all of them by the intervention of the lungs as a common centre. Some of them are placed in cavities, as the abdomen; others in the interstices of parts, as about the breast. The bones which receive air are of two kinds; some of them divided into innumerable cells; others hollowed out into one large canal. They may be distinguished from such as do not receive air by having less specific gravity; by being less vascular; by containing little oil; by having no marrow nor blood in their cells; by having less hardness and firmness than others; and by the passage for the air being perceivable.

The mechanism by which the lungs are fitted for conveying air to these cavities, is their being attached to the diaphragm, and connected also to the ribs and sides of the vertebrae. The diaphragm is perforated in several places by pretty large holes, allowing a free passage of air into the abdomen. To each of these holes is attached a distinct membranous bag, thin and transparent. The lungs open at their anterior part into membranous cells, which lie upon the sides of the pericardium, and communicate with the cells of the sternum. The superior parts of the lungs open into cells of a loose net-work, through which the trachea and œsophagus pass. When these cells are distended with air, it indicates passion, as in the case of the turkey-cock, pouting-pigeon, &c.

These cells communicate with others in the axilla, and under the large pectoral muscles; and those with the cavity of the os humeri, by means of small openings in the hollow surface near the head of that bone. Lastly, The posterior edges of the lungs have openings into the cells of the vertebrae, ribs, os sacrum, and other bones of the pelvis, from which the air finds a passage to the cavity of the thigh-bone.

Concerning the use of these cavities the doctor conjectures, that they are a kind of appendage to the lungs; and that like the bags continued through the bellies of amphibious animals, they serve as a kind of reservoirs of air. They assist birds during their flight, which must be apt to render frequent respiration difficult. He further insinuates, that this construction of the organs of respiration may assist birds in singing; which, he thinks may be inferred from the long continuance of song between the breathings of a canary bird. On tying the trachea of a cock, the animal breathed through a canula introduced into his belly; another through the os humeri, when cut across; and a hawk through the os femoris. In all these cases the animals soon died. In the first, the doctor ascribes the death to an inflammation of the bowels; but in the last, he owns it was owing to difficult breathing. What took place, however, was sufficient to show that the animals really did breathe through the bone.

their abdomen with air, and expanding their tail, they come to make the posterior part of their bodies considerably higher; and thus they fly with their bodies near in an horizontal situation. Hence we find, that if their necks are kept from being stretched out, or if you cut away their tails, they become incapable of flying any considerable way. The largeness of the wings in different fowls varies, according to the occasions of the creature. Thus birds of prey, who must fly a considerable way to provide their food, have large strong wings; whereas domestic birds, who find their nourishment almost every where, have very short and but small wings. The best account of the manner of progression of fowls, is given by Alfonso Borelli in his treatise *De motu animalium*; and in the "Religious Philosopher" we have Borelli's doctrine stript pretty much of its mathematical form. The posterior extremities are so situated as to make us at first think they would be in continual hazard of falling down forwards when they walk; but this is prevented by their holding up their heads and necks; and when they have occasion for climbing up a steep place, they stretch out their head and necks forwards. Thus we may observe a goose, entering a barn-door, where generally there is an ascending step, to stretch out its neck, which before was raised, and incline its body forwards; this is laughed at by the common people, who ascribe it to a piece of folly in the goose, as if afraid of knocking its head against the top of the door.

Carnivorous animals are provided with strong crooked claws for the catching their prey; water-fowls use them for swimming; and principally for this purpose have a strong firm membrane interposed betwixt the toes. There is a beautiful mechanism to be observed in the toes of fowls, which is of considerable use to them; for their toes are naturally drawn together or bended when the foot is bended; this perhaps proceeds from the tendons of the toes passing over in them what is analogous to our heels, and when the foot is bended must consequently be much stretched; and since they are inserted into the toes, must of necessity bend them when the foot is bended; and when the foot is extended, the flexors of the toes are again relaxed, and they therefore expanded. This is of great use to water-fowls; for had there been no such contrivance as this, they must have lost as much time when they pulled their legs in, as they had gained by the former stroke; but as the parts are now framed, whenever the creature draws in its foot, the toes are at the same time bended and contracted into less space; so that the resistance made against the water is not near so great as before: on the contrary, when they stretch their foot their toes are extended, the membrane betwixt them expanded, and consequently a greater resistance made to the water. Again, such fowls as live mostly in the air, or have occasion to sustain themselves on branches of trees in windy weather, and even in the night-time when asleep, while all their muscles are supposed to be in a state of relaxation; such have no more to do but lean down the weight of their bodies, and their toes continue bended without any muscles being in action; and whenever they would disentangle themselves, they raise up their

bodies, by which their foot, and consequently their toes, are extended.

Carnivorous fowls have their beaks long, sharp and crooked; the domestic fowls, such as the hen kind, &c. have strong short beaks, commodiously fitted to dig up and break their food; the water-fowls again have long or very broad scoop-like beaks, which is most convenient for them. The sternum of fowls is much larger proportionally than the human, and has a ridge rising in its middle for the more commodious origin of the muscles that move the wings. It is also less moveable than ours; for had it been very moveable, a great deal of the force employed for moving the wings would at every contraction of the muscles have been lost, or else some other muscles must have come in play to keep firm the sternum; but this additional weight would have been inconvenient for their progression.

What other things are most remarkable in the structure of the several viscera, we shall consider in that common domestic animal, the cock or hen, and afterwards observe the difference of their viscera chylipoietica from a carnivorous fowl.

CHAP. V. *The Anatomy of a Cock.*

THE œsophagus of this creature runs down its neck somewhat inclined to the right-side, and terminates in a pretty large membranous sac, which is the ingluvies or crop where the food is macerated and dissolved by a liquor, separated by the glands which are easily observed every where on the external surface of this bag. The effect of this maceration may be very well observed in pigeons, who are sometimes in danger of being suffocated by the pease, &c. they feed upon, swelling to such an immense bulk in their ingluvies, that they can neither get upwards nor downwards. If it be a favourite fowl, it might be preserved by opening the sack, taking out the pease and sewing up the wound.

The food getting out of this sac, goes down by the remaining part of the œsophagus into the ventriculus succenturiatus or infundibulum peyer, which is a continuation of the gullet with more numerous glands, which separate a liquor to dilute the food still more, which at length gets into the true stomach or gizzard, which consists of two very strong muscles covered externally with a tendinous aponeurosis, and lined on the inside by a very thick firm membrane, which we evidently discover to be a production of the cuticula. This might have been proved in some measure *a priori*, from taking notice that this membrane, which in chicks is only a thin slight pellicle, by degrees turns thicker and stronger, the more attrition it suffers: but there is no other animal substance, so far as we know, which grows more hard and thick by being subjected to attrition, excepting the cuticula. Hence may be drawn some kind of proof of what hath been affirmed concerning the tunica villosa of the stomach, and intestines in the human body, viz. that it was only a continuation of epidermis. Nay, all the hollow parts of the body, even arteries, veins, &c. seem to be lined vessels with a production of this membrane or one analogous to it. The use of this internal coat of the stomach of fowls is to defend the more tender parts of that viscus

104
The variety in the beaks of fowls. Its uses, &c.

105
Œsophagus. Ingluvies.

106
Ventriculus succenturiatus seu infundibulum.

107
Epidermis invests the internal surface of all the cavities and of the human body.

from

103
peculiar mechanism of the toes of fowls.

from the hard grains and little stones those creatures take down.

The digestion of these animals is performed, partly at least, by attrition, as is evinced by many experiments. We see them daily take down considerable numbers of the most solid rugged little flints they find, and these can serve for no other purpose than to help the trituration of their aliments. After these pebbles by becoming smooth are unfit for this office, they are thrown up by the mouth; hence fowls that are long confined, though never so well fed, turn lean for want of these stones to help their digestion; but this was put beyond all dispute by Mr Tavvry, who gave a species of metal to an ostrich, convex on one side, and concave on the other, but carved on both; and opening the creature's body some time after, it was found that the carving on the convex side was all obliterated, while the engraved character remained the same as before on the concave side which was not subjected to the stomach's pressure; which could not have happened had digestion been performed by a menstruum, or any other way whatsoever; but may be easily solved by allowing a simple mechanical pressure to take place.

108
Duodenum.

The duodenum begins pretty near the same place, at which the œsophagus enters; yet notwithstanding the vicinity of these two tubes, the aliments are in no danger of getting out before they are perfectly digested, by reason of a protuberance or septum medium betwixt the orifices; and in those creatures who have such a strong muscular stomach, it is a matter of great indifference, whether the entry of the œsophagus or pylorus be highest, provided that the entry of the œsophagus does not allow the food to regurgitate, since the force of the stomach can easily protrude it towards the duodenum. This gut is mostly in the right side, and hangs pendulous in their abdomen, having its two extremities fixed to the liver. The ductus communis choledochus enters near its termination, where it mounts up again to be fixed to the liver; and left, by the contraction of the intestines, the bile should pass over without being intimately blended with the chyle, that duct enters downwards contrary to the course of the food, and contrary to what is observed in any of the animals we have mentioned yet. But still the general intention is kept in view, in allowing these juices the fairest chance of being intimately blended with the food.

109
Ductus
Chole-
docus.

110
Intestina
tenua.

The small guts are proportionally larger than those of carnivorous birds, for the general cause already assigned. At the end of the ilium they have two large intestina cæca, one on each side, which serve as reservoirs to the fæces; which after some remora there regurgitate into what soon becomes the rectum, which, together with the excretories of urine, and organs of generation, empties itself into the common cloaca. The small intestines are connected by a long loose mesentery, which has little or no fat accompanying the blood vessels, there being no hazard of the blood's being stopped. There are no lacteal vessels, glandule vagæ or pancreas affusilli to be observed here. The meseraic veins are proportionally very large, if you either compare them with the corresponding arteries, or consider them with respect to the guts themselves.

The want of lacteals, &c. is supplied by these veins. As a proof of these having a communication with the guts, in larger fowls the guts can be distended by blowing in at the meseraic vein; and from this difference of structure, the use of the glandule vagæ, &c. can easily be aligned, viz. the chyle in these animals, that have lacteals, being to be mixed with the blood in a considerable quantity at a time, lest its particles should attract one another too strongly, and so hinder this mixture; it was therefore necessary it should be well diluted by the humores iniqui, which bear a very great proportion to the quantity of pure chyle; since the lymph from the inferior extremities, abdominal viscera, neck, &c. are poured into it. Here there was no hazard of any such inconveniency by the chyle being mixed with the blood in small proportion from the immense number of the small extremities of the meseraic veins.

The pancreas in the creature lies betwixt the two folds of the duodenum, and sends two or three ducts into this gut pretty near the biliary.

The spleen is here of a round globular figure, situated between the liver and stomach, and betwixt these and the back-bone it enjoys the same properties as in other animals, viz. large blood-vessels, &c. All its blood is sent into the vena portarum, and has a perpetual coagulation. It has no excretory as far as we know. Their liver is divided into two equal lobes by a pellucid membrane, running according to the length of their body; and hence we may observe, that it is not proper to that bowel to lie on the right-side, which is still more confirmed by what we observe in fishes, where it almost lies in the left-side.

The shape of their gall-bladder is not much different from that of quadrupeds, but is thought to be longer in proportion to the size of the animal, and is farther removed from the liver; though in fishes it is still further removed, not being at all contiguous; and in them the ductus hepaticus and cysticus do not unite till just at the entry into the gut. In these animals, viz. fishes, there seems to be no way of the bile getting into the gall-bladder but by regurgitation.

The principal difference to be remarked in their heart, is the want of the valvule tricuspedes, and their place being supplied by one fleshy flap.

The lungs are not loose within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in those animals that have a large motion in their spine. They are two red spongy bodies covered with a membrane that is pervious, and communicates with the large vessels or air bags that are dispersed over their whole abdomen, which vessels serve two very considerable uses; the one is to render their bodies specifically light, when they have a mind to ascend and buoy themselves up when flying, by distending their lungs with air, and also straiten their trachea arteria and so return the air.

Secondly, they supply the place of a muscular diaphragm and strong abdominal muscles; producing the same effects on the several contained viscera, as these muscles would have done without the inconveniency of their additional weight; and conducting as much to the exclusion of the egg and fæces.

The trachea arteria, near where it divides, is very much

111
Lacteal ves-
sels, how
supplied.

112
Their use in
other ani-
mals.

113
Pancreas.

114
The spleen

115
Liver.

116
Vesica fel-
lis.

117
Cor.

118
Pulmones
their struc-
ture and
uses.

119
The use
of the vesicæ
in the ab-
domen.

120
The dia-
phragm,
how sup-
plied.

121
Trachea
arteria.

much contracted, and their voice is principally owing to this coaction. If you listen attentively to a cock crowing, you will be sensible that the noise does not proceed from their throat, but deeper; nay this very pipe, when taken out of their body and cut off a little, after its division, and blown into, will make a squeaking noise, something like the voice of these creatures. On each side, a little higher than this contraction, there is a muscle arising from their sternum, which dilates the trachea. The cartilages of which the pipe is composed in this animal, go quite round it; whereas in men and quadrupeds, they are discontinued for about one-fourth on the back-part, and the intermediate space filled up by a membrane. Neither is the trachea so firmly attached to their vertebrae as in the other creatures we have examined. This structure we shall find of great service to them, if we consider, that had the same structure obtained in them as in us, their breath would have been in hazard of being stopped at every flexion or twisting of their neck, which they are frequently obliged to. This we may be sensible of by bending our necks considerably on one side, upon which we shall find a great straitness and difficulty of breathing; whereas their trachea is better fitted for following the flexions of the neck by its loose connection to the vertebrae: and as from the structure of the trachea it cannot yield to every cause distending the œsophagus as in us, it was proper they should be placed at a greater distance from each other, which we accordingly find they are.

In place of a muscular diaphragm, this creature has nothing but a thin membrane connected to the pericardium, which separates the thorax and abdomen. But besides this, the whole abdomen and thorax are divided by a longitudinal membrane or mediastinum connected to the lungs, pericardium, liver, stomach, and to the fat lying over their stomach and guts, which is analogous to an omentum, and supplies its place.

The kidneys lie in the hollow, excavated in the side of the back bone, from which there is sent out a blueish coloured canal, running along by the side of the vas deferens, and terminates directly into the common cloaca. This is the ureter, which opens by a peculiar aperture of its own, and not at the penis. This creature having no vesica urinaria, it was thought by some they never passed any urine, but that it went to the nourishment of the feathers, but this is false; for that whitish substance that you see their greenish feces covered with, and which turns afterwards chalky, is their urine. Let us next consider the organs of generation of both sexes, and first those of the male.

The testicles are situated one on each side of the back-bone, and are proportionally very large, to the creature's bulk. From these run out the vasa feminifera, at first freight, but after they recede farther from the body of the testicle, they acquire an undulated or convoluted form, as the epididymis in man. These convolutions partly supply the want of vesiculae feminales, their coition being at the same time very short; these terminate in the penis, of which this creature has two, one on each side of the common cloaca pointing directly outwards, and are very small and very short, hardly so big as a millet seed; whence they have escaped the notice of anatomists, who have

often denied their existence. This is what is chiefly remarkable in the organs of the male.

The racemus vitellorum being analogous to the ovary in the human subject, are attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averse with respect to the ovary, yet notwithstanding, by the force of the orgasmus veneris, it turns round and grasps the vitellus, which, in its passage through this duct called the *infundibulum*, receives a thick gelatinous liquor, secreted by certain glands. This, with what it receives in the uterus, compose the white of the egg. By this tube then it is carried into the uterus.

The uterus is a large bag, placed at the end of the infundibulum, full of wrinkles on its inside; here the egg is completed, receiving its last involucre, and the shell is at last pushed out at an opening in the side of the common cloaca. From the testes in the male being so very large, in proportion to the body of the creature, there must necessarily be a great quantity of semen secreted; hence the animal is salacious, and becomes capable of impregnating so many females. The want of the vesiculae feminales is in some measure supplied by the convolutions of the vasa deferentia, and by the small distance betwixt the secreting and excretory organs. The two penes contribute also very much to their short coition, at which time the opening of the uterus into the cloaca is very much dilated, that the effect of the semen on the vitelli may be the greater.

A hen will of herself indeed lay eggs, but these are not impregnated, and yet appear entirely complete, except that the small black spot, which comes afterwards to be the rudiments of the chick, is not here to be observed. After having observed the contents of the abdomen and thorax, we next proceed to examine the parts about the neck and head.

These creatures, as was observed of fowls in general, have no teeth, which would have been needless, as they swallow their food entire; but their tongue is made pretty firm, lest it should be hurt by the sharp points of the grain they feed on. It is of a triangular figure and pointed before; and as by the depending posture, their meat is in hazard of falling out of their mouths, to prevent this, there are several small pointed papillae standing out upon their tongue and palate, with their points inclined backwards, allowing an easy passage to the food, but hindering its return.

We have here no vclum palatinum, uvula, or epiglottis, and in place of two large holes opening into the nose, there is only a long narrow rima supplied with pretty strong muscles, and such another supplies the place of a glottis. The creature has a power of shutting both at pleasure; and the nature of their food seems not only to exempt them from the hazard of its getting into the nose or trachea, but its sharp points would hurt an uvula or epiglottis, if they had any. Hence we see with what difficulty they swallow dough or other sort of food that can be easily moulded into any form.

Their cranium is more cellular and cavernous than ours, by this means their heads are light, yet strong enough to resist external injuries; for the enlarging

124
Vitellari-
um.

125
Uterus.

126
The want
of the vesi-
culæ femi-
nales, how
supplied.

127
Tongue, its
form.

128
Cranium.

122
Kidneys

123
The organs
of genera-
tion in the
male.

the diameter of bones contributes to their strength. By this cavernous cranium the organ of smelling is considerably enlarged; and further, finging birds, as is observed by Mr Ray and Mr Derham, have this cavernous structure of the brain still more observable; and we are told that the cavity of the tympanum communicates with the cells; but this seems rather founded on theory than matter of fact. Their brain is covered with the common membranes, but its external surface is not formed into so many gyre or convolutions as ours. Its anterior part is quite solid, of a cineritious colour, and so far has a resemblance of the corpora striata, as to give rise to the olfactory nerves. The whole of it appears to us as imperfect, and we can scarce determine whether there be any thing analogous to a third or fourth ventricle; neither the corpus callosum, fornix, nates, or testes, &c. can be observed here; which parts therefore cannot be imagined as absolutely necessary for the functions of life, since we find these creatures perform them sufficiently well. We may perhaps think these serve a particular use in man, who is a rational creature, but then quadrupeds enjoy them in common with man. These protuberances, &c. seem rather to depend on the different disposition of the several parts, being variously connected, and meeting in different directions in different places, than their being absolutely necessary for any particular use; and the uses that have been assigned to different parts of the brain by authors, seem to have no foundation but in the author's fancy.

129
The organ
of smell-
ing.

Their organ of smelling is very large and well provided with nerves; hence they have this sensation very acute. Ravens and other birds of prey give a sure proof of this by their being able to find out their prey though concealed from their sight, and at a considerable distance.

Those birds that grope for their food in the waters, mud, &c. have large nerves which run quite to the end of their bills, by which they find out and distinguish their food.

130
Eye.

The anterior part of their eyes (instead of having the sclerotic coat continued, so as to make near a sphere as in us) turns all of a sudden flat; so that here the sclerotic makes but half a sphere; and the cornea rises up afterwards, being a portion of a very small and distinct sphere; so that in these creatures there is a much greater difference betwixt the sclerotic and cornea than in us. Hence their eyes do not jut out of their heads as in man and quadrupeds. As most of these creatures are continually employed in hedges and thickets, therefore that their eyes might be secured from these injuries, as well as from too much light when fling in the face of the sun, there is a very elegant mechanism in their eyes, which is a membrane rising from the internal canthus of the eye, which at pleasure, like a curtain, can be made to cover the whole eye, and this by means of a proper muscle that rises from the sclerotic coat and passing round the optic nerves runs through the musculus oculi attollens (by which however the optic nerves are not compressed) and palpebra to be inserted into the edge of this membrane. Whenever this muscle ceases to act, the membrane by its own elasticity again discovers the eye. This covering is neither pellucid nor

opaque, both which would have been equally inconvenient, but being somewhat transparent, allows as many rays to enter as to make any object just visible, and is sufficient to direct them in their progression. By means of this membrane it is that the eagle is said to look at the sun. Quadrupeds, as we mentioned before, have a membrana nictitans; but then it only can cover that part of the eye which is never covered by their eye-lids.

131
Bourse
noire. Its
description
and uses.

Besides, all fowls have another particularity, whose use is not so well understood; and that is a pretty long black triangular purse rising from the bottom of their eye just at the entry of the optic nerve, and stretched out into their vitreous humour, and one would imagine it gave some threads to the crystalline. To this the French (who probably were the first who took notice of it in their dissections before the Royal Academy) give the name of *bourse noire*. This may possibly serve to fuscate some of the rays of light, that they may see objects more distinctly without hurting their eyes. It has a connection with the vitreous, and seems to be joined also to the crystalline humour. If we suppose it to have a power of contraction, (which may be as well allowed as that of the iris) it may so alter the position of the vitreous and crystalline humours, that the rays from any body may not fall perpendicularly upon the crystalline; and this seems to be necessary in them, since they cannot change the figure of the anterior part of their eye so much as we can do; and as this animal is exposed often to too great a number of rays of light, so they having no tapetum, have the bottom of their eye wholly black on the retina; and in consequence of this fowls see very ill in the dark.

132
Organ of
hearing.

They have no external ear, but in place thereof a tuft of very fine feathers covering the meatus auditorius, which easily allow the rays of sound to pass them, and likewise prevent dust, or any insect from getting in. An external ear would have been inconvenient in their passing through thickets and in flying, &c. A liquor is separated in the external part of the ear or meatus auditorius to lubricate the passage, and further prevent the entrance of any insects, &c. The membrana tympani is convex externally, and no muscles are fixed to the bones of their ear, which are rather of a cartilaginous consistence; any tremulous motions impressed on the air are communicated in these creatures, merely by the spring and elasticity of these bones; so probably the membrane is not so distended as in the human ear, where this is done by muscles. The cochlea and semicircular canals are very distinct and easily prepared.

CHAP. VI. The Anatomy of a carnivorous Fowl.

We come next to the birds of prey, and for an example shall take a stentil. The principal difference to be observed in them, is in their chylipoietic viscera, which may be accounted for from their different way of life.

133

Immediately under their clavicles, you will observe the œsophagus expanded into their ingluviæ, which is proportionally less than in the granivorous kind, since their food does not swell so much by maceration, and for the same reason there is a less quantity of a menstruum to be found here.

134
Ingluviæ.

135 The ventriculus succenturiatus plentifully stored with glands, situated immediately above their stomach, which we see here is evidently membranous, otherwise than in the granivorous kind; and this difference, which is almost the only one we shall find betwixt the two different species of fowls, is easily accounted for from the nature of their food, which requires less attrition, being easier of digestion than that of the other kind; nevertheless it seems requisite it should be stronger than the human, to compensate the want of abdominal muscles, which are here very thin.

136 The same mechanism obtains in this creature's duodenum, that we have hitherto observed. As being a carnivorous animal, its guts are proportionally shorter than those of the granivorous kind, for the reason first given, viz. its food being more liable to corrupt, therefore not proper to be long detained in the body, and for that reason it has no intestine caeca, of which the other species of fowls have a pair. The difference in their wings, backs, and claws are obvious, and have been already in some measure observed.

CHAP. VII. The Anatomy of Fishes.

137 AQUEOUS animals are generally divided into such as have lungs, and such as want them. The first species differ very inconsiderably from an ox or any other quadruped, and are not easily procured; so that all we have to say on fishes, shall be taken from that species, which is not provided with respiratory organs.

138 Of these we may first observe, that they have a very strong thick cuticle composed evidently of a great number of scales laid one on another like the tiles of houses; this among other arguments serves to prove the human epidermis to be of a squamous structure.

139 In the next place these creatures have neither anterior nor posterior extremities, as quadrupeds and fowls: for their progression is performed in a different way from either of these species of animals; for this purpose they are provided with machines properly consisting of a great number of elastic beams, connected to one another by firm membranes, and with a tail of the same texture; their spine is very moveable towards the posterior part, and the strongest muscles of their bodies are inserted there. Their tails are so framed as to contract to a narrow space when drawn together to either side, and to expand again when drawn to a straight line with their bodies, so by the assistance of this broad tail, and the fins on their sides, they make their progression much in the same way as a boat with oars on its sides and rudder at its stern. The perpendicular fins situated on the superior part of their body keep them in equilibrium, hindering the belly from turning uppermost, which it would readily do, because of the air bag in the abdomen rendering their belly specifically lighter than their back, but by the resistance these fins meet with when inclined to either side, they are kept with their backs always uppermost. The best account of this matter we have in the treatise before mentioned, viz. *Be-relle de motu Animalium*, Part I. chap. 23.

It may be next observed, that these creatures have nothing that can be called a neck, seeing they seek their food in an horizontal way, and can move their bo-

140 dies either upwards or downwards as they have occasion by the contraction or dilatation of their air bag; a long neck, as it would hinder their progression, would be very disadvantageous in the element they live in.

The abdomen is covered on the inferior part with a black-coloured thin membrane resembling our peritoneum. It is divided from the thorax by a thin membranous partition, which has no muscular appearance; so that we have now seen two different sorts of animals that have no muscular diaphragm.

141 These creatures are not provided with teeth proper for breaking their aliment into smaller morsels; as the food they use is generally small fishes or other animals that need no trituration in the mouth, but spontaneously corrupt, and gradually dissolve into a liquid chyle. Their teeth serve to grasp their prey and hinder the creatures they have once caught from escaping again. For the same purpose the internal cartilaginous basis of the bronchi, and the two round bodies situated in the posterior part of the jaws, have a great number of tender-hooks fixed into them in such a manner, as that any thing can easily get down, but is hindered to get backwards. The water that is necessarily taken in along with their food in too great quantities to be received into their jaws in deglutition, passes betwixt the interstices of the bronchi, and the flap that covers them. The compression of the water on the bronchi is of considerable use to the creature, as we shall explain by and by.

142 The oesophagus in these creatures is very short, and scarcely distinguished from their stomach, seeing their food lies almost equally in both. The stomach is of an oblong figure. There are commonly found small fishes in the stomach of large ones, still retaining their natural form, but when touched they melt down into a jelly. From this and the great quantity of liquors poured into their stomachs, we may conclude that digestion is solely brought about in them, by the dissolving power of a menstruum, and that no trituration happens here.

143 The guts in these animals are very short, making only three turns, the last of which ends in the common cloaca for the feces, urine and semen, situated about the middle of the inferior part of their bodies.

144 What we call the *pancreas*, is by some named the *intestinula caeca*. It consists of a very great number of small threads, like so many little worms, which all terminate at last in two larger canals, that open into the first gut, and pour into it a viscous liquor, much about the place where the biliary ducts enter. Their intestines are connected to the back-bone by a membrane analogous to a mesentery. No lacteals have been yet observed, and it is probable, their aliment is taken in by the meseraic veins.

145 Their liver is very large, of a whitish colour, and lies almost in the left-side wholly, and contains a great deal of fat.

146 The gall-bladder is situated a considerable way from the liver, and sends out a canal, the cystic duct, which joins with the hepatic duct just at the entry into the gut; some fibres are stretched from the liver to the gall-bladder, but none have hitherto discovered any cavity in these cords; so that in this animal it

140 Teeth, for what made.

141 Digestion performed solely by a menstruum.

143 Intestina.

143 Pancreas.

144 Liver, gall-bladder, and their ducts.

should seem impossible that the bile can be carried into the gall-bladder in the ordinary way, and consequently must either be secreted on the sides of that sac, or regurgitate into it from the canalis choledochus.

145
Spleen, its
use drawn
from ana-
logy.

The spleen is placed near the back-bone, and at a place where it is subjected to an alternate pressure from the constriction and dilatation of the air-bag, which is situated in the neighbourhood. Since in all animals, we find the spleen attached to somewhat that may give it a concussion, as in the human subject and quadrupeds, it is contiguous to the diaphragm; in fowls it is placed betwixt the back-bone, the liver and stomach; in fishes it lies on the sacculus ærius; and since we find it so well served with blood-vessels, and all its blood returning into the liver, we must not conclude the spleen to be an inutile pondus, only to serve as a balance to the animal pro equilibrio, but particularly designed for preparing the blood to the liver.

146
Organs of
generation.

The only organs of generation in this animal are two menstruous bags situated in the abdomen uniting near the podex. These in the male are filled with a whitish firm substance called the *milt*, and in the female with an infinite number of little ova clustered together, of a reddish yellow colour called the *roe*. Both these at spawning time we find very much distended; whereas, at another time, the male organs can scarce be distinguished from the female, nor is there any proper instrument in the male for throwing the seed into the organs of the female, as in other creatures. We shall not take upon us to determine the way whereby the female sperm is impregnated; but we find, that the spawn of frogs consists in the small specks wrapt up in a whitish glutinous liquor; these specks are the rudiments of the young frogs, which are nourished in that liquor, till they are able to go in search of their food. In the same way the ova of fishes are thrown out and deposited in the sand, the male being for the most part ready to impregnate them, and they are incubated by the heat of the sun. It is curious enough to remark with what care they seek for a proper place to deposit their ova, by swimming to the shallow, where they can better enjoy the sun's rays, and shun the large jaws of other fishes. The river fishes again spawn in some creek, free from the hazard of the impetuous stream. But whether this mixture be brought about in fishes, by a simple application of the genitals to each other; or if both of them throw out their liquors at the same time in one place, and thus bring about the desired mixture, is not easy to determine; the latter seems most probable. These creatures are so shy that we cannot possibly get to observe their way of copulation, and are consequently but little acquainted with their natural history.

147
The air-
bladder,
and its
uses.

After raising up the black peritoneum, there comes in view an oblong white membranous bag, in which there is nothing contained but air. This is the swimming-bladder; it lies close to the back-bone, and has a pretty strong muscular coat, whereby it can contract itself. By contracting this bag, they can make the muscles specifically heavier than water and so readily fall to the bottom; whereas the muscular fibres ceasing to act, they become specifically lighter than water and so swim above. According to the different

degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleasure. Hence flounders, soles, raia, and such other fishes as want this sac, are found always groveling at the bottom of the water: it is owing to this that dead fishes (unless this membrane has been previously broke) are found swimming a-top, the muscular fibres then ceasing to act, and that with their bellies uppermost; for the back-bone cannot yield, and the distended sac is protruded into the abdomen, and the back is consequently heaviest at its upper part according to their posture. There is here placed a glandular substance containing a good quantity of red blood, and all the red in their body is contiguous to this air bag, excepting the guts. From the anterior part of the bag, go out two processes or appendices, which, according to the gentlemen of the French academy, terminate in their fauces; but there is great reason to suspect that their experiments were inaccurately made; and that there is here, as in some places of the human body, an aer insus.

At the superior part of this bag there are other red coloured bodies, of a glandular nature, which are connected with the kidneys. From them the ureters go down to their insertion in the vesica urinaria, which lies in the lower part of the abdomen, and the urethra is there produced, which terminates in the podex.

These last mentioned parts have not hitherto been observed in some species of fishes, whence authors too hastily denied them in all. These creatures have a membranous diaphragm which forms a sac, in which the heart is contained. It is very tense, and almost perpendicular to the vertebre.

The heart is of a triangular form with its base downwards, and its apex uppermost, which situation it has because of the branchie. It has but one auricle and one ventricle, because they want lungs; and one great artery. The size of the auricle and ventricle are much the same; the artery sends out numberless branches to the branchie or gills.

The branchie lie in two large slits at each side of their heads, and seem to be all they have that bears any analogy to lungs. Their form is semi-circular; they have a vast number of red fibrille standing out on each side of them like a fringe, and very much resemble the vane of a feather. These branchie are perpetually subjected to an alternate motion and pressure from the water; and we may here remark, that we have not found any red blood, but in places subjected to this alternate pressure; this observation will help us in explaining the action of the lungs upon the blood. Over these gills there is a large flap, allowing a communication externally, by which the water they are obliged to take into their mouths with their food finds an exit, without passing into their stomach; it is owing to these flaps coming so far down, that the heart is said commonly to be situated in their heads.

Their brains are formed pretty much in the same way as that of fowls, only we may observe that the posterior lobes bear a greater proportion to the anterior.

Their organ of smelling is large, and they have a power of contracting and dilating the entry into their nose

144
Its pres-
sus, or
municus
with the
ventricles

144
Ureter
fusa Ur-
ria.
Urethra

150
Dia-
phragm

15
The heart
has but one
auricle and
one ventricle.

151
The branchie
lie in two large
slits at each side
of their heads, and
seem to be all they
have that bears any
analogy to lungs.

153
Cerebrum

154
Organ of
smell.

nose as they have occasion. It seems to be mostly by their acute smell that they discover their food; for their tongue seems not to have been designed for a very nice sensation, being of a pretty firm cartilaginous substance; and common experiment evinces, that their sight is not of so much use to them as their smell in searching for their nourishment. If you throw a fresh worm into the water, a fish shall distinguish it at a considerable distance; and that this is not done by the eye, is plain from observing, that after the same worm has been a considerable time in the water and lost its smell, no fishes will come near it: but if you take out the bait and make several little incisions into it, so as to let out more of the odoriferous effluvia, it shall have the same effect as formerly. Now it is certain, had the creatures discovered this bait with their eyes, they would have come equally to it in both cases: in consequence of their smell being the principal means they have of discovering their food, we may frequently observe their allowing themselves to be carried down with the stream, that they may ascend again leisurely against the current of the water; thus the odorous particles swimming in that medium, being applied more forcibly to their smelling organs, produce a stronger sensation.

155
Optic
nerves.

The optic nerves in these animals are not confounded with one another in their middle progress betwixt their origin and the orbit, but the one passes over the other without any communication; so that the nerve that comes from the left side of the brain goes distinctly to the right eye: and *vice versa*.

156
The crystalline hum-
our a
compleat
sphere, and
why.

The lens crystallina is here a compleat sphere; whereas in men and all other terrestrial animals it consists of two portions of unequal spheres laid on one another: to account for this, it must be considered that these creatures have got no aqueous humour, as the rays that come to their eyes are conveyed through a medium of the same density with that humour in other animals, and consequently would have gone on

in a straight line without any refraction till they came to the lens, although they had been provided with an aqueous humour; thus then the rays impinging upon their lens have hitherto suffered no refraction; that they might therefore be sufficiently refracted and meet in a point on the retina, it was necessary the lens should be made more convex than it is in other creatures who have the rays considerably refracted in their passage from the air through the aqueous humour.

As fishes are continually exposed to injuries in the uncertain element they live in, and as they are in perpetual danger of becoming a prey to the larger ones, it was necessary their eyes should never be shut, and in consequence of this they are not provided with palpebræ; but then, as in the current itself, the eye must be exposed to several injuries, there was a necessity it should be sufficiently defended, which in effect it is by a firm pellucid membrane that seems to be a continuation of the cuticula, being stretched over here. The epidermis is very proper for this purpose, as being insensible and destitute of vessels, and consequently not liable to obstructions, or by that means of becoming opaque.

157
Fishes, if
they hear
or not.

Whether fishes have a sense of hearing or not is very uncertain: all that has the appearance of an organ of hearing in these creatures is a bone, about the bulk of one half of a common bean, of a particular structure, being very brittle and composed of a great many different segments laid at one another's sides, and situated in a particular form at the side of the brain; is then the idea of sound communicated to them by means of this bone? or does their running away, at stamping hard on the ground or crying loud, depend upon some other kind of sensation? This may possibly be produced in them, by a tremulous motion communicated to their bodies by the circumambient water, which is put in agitation, from the like concussions happening in the air or neighbouring ground.

C O M

COMPARATIVE Degree, among grammarians, that between the positive and superlative degrees, expressing any particular quality above or beneath the level of another.

COMPARISON, in a general sense, the consideration of the relation between two persons or things, when opposed and set against each other, by which we judge of their agreement or difference.

COMPARISON of Ideas, an act of the mind, whereby it compares its ideas one with another, in respect of extent, degree, time, place, or any other circumstances. See IDEA.

Brutes seem not to have this faculty in any great degree: they have, probably, several ideas distinct enough; but cannot compare them farther than as to some sensible circumstances annexed to the objects themselves; the power of comparing general ideas, which we observe in men, we may probably conjecture they have not at all.

COMPARISON, in grammar, the inflection of the comparative degree. See GRAMMAR, n° 54.

COMPARISON, in rhetoric, is a figure whereby two

C O M

things are considered with regard to some third, which is common to them both.

Instruction is the principal, but not the only end of comparison. It may be employed with success in putting a subject in a strong point of view. A lively idea is formed of a man's courage by likening it to that of a lion; and eloquence is exalted in our imagination comparing it to a river overflowing its bank, and involving all in its impetuous course. The same effect is produced by contrast: a man in prosperity becomes more sensible of his happiness, by comparing his condition with that of a person in want of bread. Thus comparison is subservient to poetry as well as to philosophy.

Comparisons serve two purposes: when addressed to the understanding, their purpose is to instruct: when to the heart, their purpose is to please. Various means contribute to the latter: 1st, the suggesting some unusual resemblance or contrast; 2^d, the setting an object in the strongest light; 3^d, the associating an object with others that are agreeable; 4th, the elevating an object; and 5th, the depressing it. And that com-

* See the
article
RESEM-
BLANCE
and Diff-
parisons mislead.

Comparison parisons may give pleasure by these various means, will be made evident by examples which shall be given, after premising some general observations.

Objects of different senses cannot be compared together; for such objects are totally separated from each other, and have no circumstance in common to admit either resemblance or contrast. Objects of hearing may be compared together, as also of taste, of smell, and of touch: but the chief fund of comparison are objects of sight; because, in writing or speaking, things can only be compared in idea, and the ideas of sight are more distinct and lively than those of any other sense.

When a nation emerging out of barbarity begins to think of the fine arts, the beauties of language cannot long lie concealed; and when discovered, they are generally, by the force of novelty, carried beyond all bounds of moderation. Thus, in the earliest poems of every nation, we find metaphors and similes founded on the slightest and most distant resemblances, which, losing their grace with their novelty, wear gradually out of repute; and now, by the improvement of taste, no metaphor nor simile is admitted into any polite composition but of the most striking kind. To illustrate this observation, a specimen shall be given afterward of such metaphors as we have been describing: with respect to similes take the following specimen.

"Behold, thou art fair, my love: thy hair is as
"a flock of goats that appear from Mount Gilead:
"thy teeth are like a flock of sheep from the wash-
"ing, every one bearing twins: thy lips are like
"a thread of scarlet: thy neck like the tower of
"David built for an armoury, whereon hang a
"thousand shields of mighty men: thy two breasts
"like two young roes that are twins, which feed
"among the lilies: thy eyes like the fish-pools in
"Hesbon, by the gate of Bath-rabbim: thy nose
"like the tower of Lebanon, looking toward Da-
"mascus." *Song of Solomon.*
"Thou art like snow on the heath; thy hair
"like the mist of Cromla, when it curls on the
"rocks and shines to the beam of the west: thy
"breasts are like two smooth rocks seen from
"Branno of the streams: thy arms like two white
"pillars in the hall of the mighty Fingal."

Fingal.

It has no good effect to compare things by way of simile that are of the same kind; nor to contrast things of different kinds. The reason is given in the article above cited on the margin, and shall be here illustrated by examples. The first is a comparison built upon a resemblance so obvious as to make little or no impression. Speaking of the fallen angels searching for mines of gold:

A numerous brigade hasten'd: as when bands
Of pioneers with spade and pick-ax arm'd,
Forerun the royal camp to trench a field
Or cast a rampart.

Milton.

The next is of things contrasted that are of different kinds.

Queen. What, is my Richard both in shape and mind

Transform'd and weak? Hath Bolingbroke depos'd

Thine intellect? Hath he been in thy heart?

The lion, dying, thrusteth forth his paw,
And wounds the earth, if nothing else, with rage
To be o'erpower'd: and wilt thou, pupil like,
Take thy correction mildly, kiss the rod,
And fawn on rage with base humility?

Richard II. act 5. sc. 1.

This comparison has scarce any force: a man and a lion are of different species, and therefore are proper subjects for a simile; but there is no such resemblance between them in general, as to produce any strong effect by contrasting particular attributes or circumstances.

A third general observation is, That abstract terms can never be the subject of comparison, otherwise than by being personified. Shakspeare compares adversity to a road, and slander to the bite of a crocodile; but in such comparisons these abstract terms must be imagined sensible beings.

To have a just notion of comparisons, they must be distinguished into two kinds; one common and familiar, as where a man is compared to a lion in courage, or to a horse in speed; the other more distant and refined, where two things that have in themselves no resemblance or opposition, are compared with respect to their effects. There is no resemblance between a flower-plot and a cheerful song; and yet they may be compared with respect to their effects, the emotions they produce in the mind being extremely similar. There is as little resemblance between fraternal concord and precious ointment; and yet observe how successfully they are compared with respect to the impressions they make.

"Behold, how good and how pleasant it is for
"brethren to dwell together in unity. It is like
"the precious ointment upon the head, that ran
"down upon Aaron's beard, and descended to the
"skirts of his garment." *Psalms 133.*

For illustrating this sort of comparison, we shall add some more examples:

"Delightful is thy presence, O Fingal! it is like
"the sun on Cromla, when the hunter mourns his
"absence for a season, and sees him between the
"clouds.
"Did not Ossian hear a voice; or is it the sound
"of days that are no more? Often, like the even-
"ing-fun, comes the memory of former times on
"my soul.

"His countenance is settled from war; and is
"as calm as the evening-beam, that from the cloud
"of the west looks on Cona's silent vale."

Fingal.

We now proceed to illustrate, by particular instances, the different means by which comparisons, whether of the one sort or the other, can afford pleasure; and, in the order above established, we shall begin with such instances as are agreeable, by suggesting some unusual resemblance or contrast.

Sweet are the uses of Adversity,
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in her head.

As you like it, act 2. sc. 1.

See, how the Morning opes her golden gates,
And takes her farewell of the glorious sun;

How

How well resembles it the prime of youth,
Trim'd like a yonker prancing to his love.

Second Part Henry VI. act 2. sc. 1.

Thus they their doubtful consultations dark
Ended, rejoicing in their matchless chief:
As when from mountain tops, the dusky clouds
Ascending, while the North-wind sleeps, o'erspread
Heav'n's cheerful face, the lowering element
Scowls o'er the darken'd landscape, snow, and
shower;

If chance the radiant sun with farewell sweet
Extends his ev'ning-beam, the fields revive,
The birds their notes renew, and bleating herds
Attest their joy, that hill and valley rings.

Paradise Lost, book 2.

None of the foregoing similes tend to illustrate the principal subject: and therefore the chief pleasure they afford must arise from suggesting resemblances that are not obvious: for undoubtedly a beautiful subject introduced to form the simile affords a separate pleasure, which is felt in the similes mentioned, particularly in that cited from Milton.

The next effect of a comparison in the order mentioned, is to place an object in a strong point of view; which effect is remarkable in the following similes.

As when two scales are charg'd with doubtful loads,
From side to side the trembling balance nods,
(While some laborious matron, just and poor,
With nice exactness weighs her woolly folds),
Till pois'd aloft, the resting beam suspends
Each equal weight; nor this nor that descends:
So stood the war, till Hector's matchless might,
With fates prevailing, turn'd the scale of fight.
Pierce as a whirlwind up the wall he flies,
And fires his host with loud repeated cries.

Iliad, b. xii. 521.

—She never told her love;
But let concealment, like a worm i' th' bud,
Feed on her damask cheek: she pin'd in thought;
And with a green and yellow melancholy,
She sat like patience on a monument,
Smiling at grief.

Twelfth Night, act 2. sc. 6.

"There is a joy in grief when peace dwells with
the sorrowful. But they are wasted with mourn-
ing, O daughter of Toscar, and their days are
few. They fall away like the flower on which
the sun looks in his strength, after the mid dew
has passed over it, and its head is heavy with the
drops of night."

Fingal.

—Out, out, brief candle!
Life's but a walking shadow, a poor player,
That thruts and frets his hour upon the stage,
And then is heard no more.

Macbeth, act 5. sc. 5.

O thou goddess,
Thou divine nature! how thyself thou blazon'it
In these two princely boys! they are as gentle
As zephyrs blowing below the violet,
Not wagging his sweet head; and yet as rough
(Their royal blood inchas'd) as the rud'ft wind,
That by the top doth take the mountain-pine,
And make him stoop to th' vale.

Cymbeline, act 4. sc. 4.

"Why did not I pass away in secret, like the
flower of the rock that lifts its fair head unseen,
and throws its withered leaves on the blast?"

Fingal.

As words convey but a faint and obscure notion of great numbers, a poet, to give a lively notion of the object he describes with regard to number, does well to compare it to what is familiar and commonly known. Thus Homer compares the Grecian army in point of number to a swarm of bees: in another passage he compares it to that profusion of leaves and flowers which appear in the spring, or of insects in a summer's evening: And Milton,

—As when the potent rod
Of Amram's son in Egypt's evil day
Wav'd round the coast, up call'd a pithy cloud
Of locusts, warping on the eastern wind,
That o'er the realm of impious Pharaoh hung
Like night, and darken'd all the land of Nile:
So numberless were those bad angels seen,
Hov'ring on wing under the cope of hell,
'Twixt upper, nether, and surrounding fires.

Paradise Lost, book 1.

Such comparisons have, by some writers, been condemned for the lowliness of the images introduced: but surely without reason; for, with regard to numbers, they put the principal subject in a strong light.

The foregoing comparisons operate by resemblance; others have the same effect by contrast.

York. I am the last of noble Edward's sons,
Of whom thy father, prince of Wales, was first;
In war, was never lion rag'd more fierce;
In peace, was never gentle lamb more mild;
Than was that young and princely gentleman.
His face thou hast, for even so look'd he,
Accomplish'd with the number of thy hours.
But when he frown'd, it was against the French,
And not against his friends. His noble hand
Did win what he did spend; and spent not that
Which his triumphant father's hand had won.
His hands were guilty of no kindred's blood,
But bloody with the enemies of his kin.
Oh Richard, York is too far gone with grief,
Or else he never would compare between.

Richard II. act 2. sc. 3.

Milton has a peculiar talent in embellishing the principal subject, by associating it with others that are agreeable; which is the third end of a comparison. Similes of this kind have, beside, a separate effect: they diversify the narration by new images that are not strictly necessary to the comparison: they are short episodes, which, without drawing us from the principal subject, afford great delight by their beauty and variety.

He scarce had ceas'd, when the superior fiend
Was moving toward the shore; his pond'rous shield,
Ethereal temper, maffy, large, and round,
Behind him cast; the broad circumference
Hung on his shoulders like the moon, whose orb
Through optic glass the Tuscan artist views
At ev'ning from the top of F'cole,
Or in Valdarno, to descry new lands,
Rivers, or mountains, in her spotty globe.

Milton, book 1.

—Thus

Thus far these beyond
Compare of mortal powers, yet observ'd
Their dread commander. He, above the rest,
In shape and stature proudly eminent,
Stood like a tow'r; his form had not yet lost
All her original brightness, nor appear'd
Less than archangel ruin'd, and th' excess
Of glory obscur'd: as when the sun new-risen
Looks through the horizontal misty air
Shorn of his beams; or, from behind the moon
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Perplexes monarchs.

Milton, book 1.

As when a vulture on Imaus bred,
Whose snowy ridge the roving Tartar bounds,
Dislodging from a region scarce of prey
To gorge the flesh of lambs, or yearning kids,
On hills where flocks are fed, flies toward the springs
Of Ganges or Hydaspes, Indian streams,
But in his way lights on the barren plains
Of Sericana, where Chinese drive
With sails and wind their cany waggons light:
So on this windy sea of land, the fiend
Walk'd up and down alone, bent on his prey

Milton, book 3.

Next of comparisons that aggrandise or elevate.
These affect us more than any other sort: the reason
of this will be evident from the following instances.

As when a flame the winding valley fills,
And runs on crackling shrubs between the hills,
Then o'er the stubble up the mountain flies,
Flies the high woods, and blazes to the skies,
This way and that, the spreading torrent roars;
So sweeps the hero through the wasted shores.
Around him wide, immense destruction pours,
And earth is delug'd with the sanguine show'rs.

Iliad xx. 569.

Methinks, king Richard and myself should meet
With no less terror than the elements
Of fire and water, when their thundering shock,
At meeting tears the cloudy cheeks of heaven.

Richard II. act 3. sc. 5.

"As rusheth a foamy stream from the dark shady
"steep of Cromla, when thunder is rolling above,
"and dark brown night rests on the hill: so fierce,
"so vast, so terrible, rush forward the sons of Erin.
"The chief, like a whale of ocean followed by all
"its billows, pours valour forth as a stream, rolling
"its might along the shore."

Fingal, book 1.

"As roll a thousand waves to a rock, so Swa-
"ran's host came on; as meets a rock a thousand
"waves, so Inisfail met Swaran."

Ibid.

The last article mentioned, is that of lessening or
depressing a hated or disagreeable object; which is
effectually done by resembling it to any thing low or
despicable.

Thus Milton, in his description of the rout of the
rebel-angels, happily expresses their terror and dismay
in the following simile:

As a herd
Of goats or timorous flock together throng'd
Drove them before him thunder-struck, pursu'd

With terrors and with furies to the bounds
And crystal wall of heav'n, which op'ning wide,
Roll'd inward, and a spacious gap disclos'd
Into the wasteful deep; the monstrous fight
Struck them with horror backward, but far worse
Urg'd them behind; headlong themselves they threw
Down from the verge of heav'n

Milton, book 6.

By this time the different purposes of comparison,
and the various impressions it makes on the mind, are
sufficiently illustrated by proper examples. This was
an easy work. It is more difficult to lay down rules
about the propriety or impropriety of comparisons;
in what circumstances they may be introduced, and in
what circumstances they are out of place. It is evi-
dent that a comparison is not proper upon every oc-
casion: a man in his cool and sedate moments, is not
disposed to poetical flights, nor to sacrifice truth and
reality to the delusive operations of the imagination;
far less is he so disposed, when oppressed with care,
or interested in some important transaction that occu-
pies him totally. On the other hand, it is observable,
that a man, when elevated or animated by any pas-
sion, is disposed to elevate or animate all his subjects:
he avoids familiar names, exalts objects by circumlo-
cution and metaphor, and gives even life and volun-
tary action to inanimate beings. In this warmth of
mind, the highest poetical flights are indulged, and
the boldest similes and metaphors relished. But with-
out soaring so high, the mind is frequently in a tone
to relish chaste and moderate ornament; such as com-
parisons that set the principal object in a strong point
of view, or that embellish and diversify the narration.
In general, when by any animating passion, whether
pleasant or painful, an impulse is given to the imagi-
nation; we are in that condition disposed to every
sort of figurative expression, and in particular to com-
parisons. This in a great measure is evident from
the comparisons already mentioned; and shall be fur-
ther illustrated by other instances. Love, for example,
in its infancy, rousing the imagination, prompts the
heart to display itself in figurative language, and in
similes:

Troilus. Tell me, Apollo, for thy Daphne's love,
What Cressid is, what Pandar, and what we?
Her bed is India, there she lies, a pearl:
Between our Ilium, and where she resides,
Let it be call'd the wild and wandering flood;
Ourself the merchant, and this sailing Pandar
Our doubtful hope, our convoy, and our bark.

Troilus and Cressida, act 1. sc. 1.

Again:

Come, gentle night; come, loving black-brow'd
night!

Give me my Romeo; and, when he shall die,
Take him, and cut him out in little stars,
And he will make the face of heav'n so fine,
That all the world shall be in love with night,
And pay no worship to the garish sun.

Romeo and Juliet, act 3. sc. 4.

But it will be a better illustration of the present
head, to give examples where comparisons are im-
properly introduced. Similes are not the language of a
man in his ordinary state of mind, dispatching his
daily

Comparison daily and usual work : for that reason, the following speech of a gardener to his servant, is extremely improper :

Go bind thou up yon dangling apricots,
Which, like unruly children, make their fire
Stoop with oppression of their prodigal weight :
Give some supportance to the bending twigs.
Go thou, and, like an executioner,
Cut off the heads of too-fast-growing sprays,
That look too lofty in our commonwealth :
All must be even in our government.

Richard II. act 3. sc. 7.

The fertility of Shakespear's vein betrays him frequently into this error.

Rooted grief, deep anguish, terror, remorse, despair, and all the severe dispiriting passions, are declared enemies, perhaps not to figurative language in general, but undoubtedly to the pomp and solemnity of comparison. Upon this account, the simile pronounced by young Rutland, under terror of death from an inveterate enemy, and praying mercy, is unnatural :

So looks the pent-up lion o'er the wretch
That trembles under his devouring paws ;
And so he walks insulting o'er his prey,
And so he comes to rend his limbs asunder.
Ah, gentle Clifford, kill me with thy sword,
And not with such a cruel threat'ning look.

Third part Henry VI. act 1. sc. 5.

A man spent and dispirited after losing a battle, is not disposed to heighten or illustrate his discourse by similes.

York. With this we charg'd again ; but out ! alas,
We bodg'd again ; as I have seen a swan
With bootless labour swim against the tide,
And spend her strength with over-matching waves.
Ah ! hark, the fatal followers do pursue ;
And I am faint and cannot fly their fury.
The sands are number'd that make up my life ;
Here must I stay, and here my life must end.

Third part Henry VI. act 1. sc. 6.

Similes thus unseasonably introduced are finely ridiculed in the "Rehearsal."

"*Bayes.* Now here she must make a simile.

"*Smith.* Where's the necessity of that, Mr Bayes?

"*Bayes.* Because she's surprized ; that's a general rule ; you must ever make a simile when you are surprized ; 'tis a new way of writing."

A comparison is not always faultless, even where it is properly introduced. A comparison, like other human productions, may fall short of its end ; of which defect instances are not rare even among good writers : and to complete the present subject, it will be necessary to make some observations upon such faulty comparisons. Nothing can be more erroneous than to institute a comparison too faint : a distant resemblance or contrast fatigues the mind with its obscurity, instead of amusing it ; and tends not to fulfil any one end of a comparison. The following similes seem to labour under this defect.

K. Rich. Give me the crown.—Here, cousin, seize the crown,

Here, on this side, my hand ; on that side, thine.
Now is this golden crown like a deep well,
That owes two buckets, filling one another ;
Vol. III.

The emptier ever dancing in the air,
The other down, unseen and full of water ;
That bucket down, and full of tears, am I,
Drinking my griefs, whilst you mount up on high.

Richard II. act 4. sc. 3.

K. John. Oh ! cousin, thou art come to set mine eye ;

The tackle of my heart is crack'd and burnt ;
And all the shrouds wherewith my life should fail,
Are turned to one thread, one little hair :
My heart hath one poor string to stay it by,
Which holds but till thy news be uttered.

King John, act 5. sc. 10.

York. My uncles both are slain in rescuing me :
And all my followers to the eager foe
Turn back, and fly like ships before the wind,
Or lambs pursued by hunger-starved wolves.

Third part Henry VI. act 1. sc. 6.

The latter of the two similes is good : the former, because of the faintness of the resemblance, produces no good effect, and crowds the narration with an useless image.

In an epic poem, or in any elevated subject, a writer ought to avoid raising a simile upon a low image, which never fails to bring down the principal subject. In general, it is a rule, that a grand object ought never to be resembled to one that is diminutive, however delicate the resemblance may be : for it is the peculiar character of a grand object to fix the attention, and swell the mind ; in which state, it is disagreeable to contract the mind to a minute object, however elegant. The resembling an object to one that is greater, has, on the contrary, a good effect, by raising or swelling the mind : for one passes with satisfaction from a small to a great object ; but cannot be drawn down, without reluctance, from great to small. Hence the following similes are faulty.

Meanwhile the troops beneath Patroclus' care,
Invade the Trojans, and commence the war.
As wasps, provok'd by children in their play,
Pour from their mansions by the broad highway,
In swarms the guiltless traveller engage,
Whet all their stings, and call forth all their rage ;
All rise in arms, and with a general cry
Assert their waxen domes and buzzing progeny :
Thus from the tents the fervent legion swarms,
So loud their clamours, and so keen their arms.

Iliad xvi. 312.

So burns the vengeful hornet (foul all o'er)
Repuls'd in vain, and thirty still of gore ;
(Bold son of air and heat) on angry wings
Untam'd, untir'd, he turns, attacks, and stings.
Fir'd with like ardour, fierce Atreides flew,
And sent his soul with ev'ry lance he threw.

Iliad, xvii. 642.

An error opposite to the former, is the introducing a resembling image, so elevated or great as to bear no proportion to the principal subject. Their remarkable disparity, being the most striking circumstance, seizes the mind, and never fails to depress the principal subject by contrast, instead of raising it by resemblance : and if the disparity be exceeding great, the simile takes on an air of burlesque ; nothing being more ridiculous than to force an object out of its pro-

Comparison per rank in nature, by equalling it with one greatly superior or greatly inferior. This will be evident from the following comparison.

Loud as a bull makes hill and valley ring,
So roar'd the lock when it releas'd the spring.

Odyssey, xxi. 51.

Such a simile upon the simplest of all actions, that of opening a lock, is pure burlesque.

A writer of delicacy will avoid drawing his comparisons from any image that is nauseous, ugly, or remarkably disagreeable; for however strong the resemblance may be, more will be lost than gained by such comparison. Therefore we cannot help condemning, though with some reluctance, the following simile, or rather metaphor.

O thou fond many! with what loud applause
Didst thou beat heav'n with blessing Bolingbroke
Before he was what thou would'st have him be?
And now being trimm'd up in thine own desires,
Thou, beastly feeder, art so full of him,
That thou provok'st thyself to cast him up.
And so, thou common dog, didst thou disgorge
Thy glutton bosom of the royal Richard,
And now thou would'st eat thy dead vomit up,
And how! 't to find it.

Second Part Henry IV. act 1. sc. 6.

The strongest objection that can lie against a comparison is, that it consists in words only, not in sense. Such false coin, or bastard-wit, does extremely well in burlesque; but it is far below the dignity of the epic, or of any serious composition.

The noble sister of Popicola,
The moon of Rome; chaste as the icicle
That's curd'd by the frost from purest snow,
And hangs on Dian's temple.

Coriolanus, act 5. sc. 3.

There is evidently no resemblance between an icicle and a woman, chaste or unchaste: but chastity is cold in a metaphorical sense, and an icicle is cold in a proper sense; and this verbal resemblance, in the hurry and glow of comparing, has been thought a sufficient foundation for the simile. Such phantom similes are mere witticisms, which ought to have no quarter, except where purposely introduced to provoke laughter. Lucian, in his dissertation upon history, talking of a certain author, makes the following comparison, which is verbal merely.

"This author's descriptions are so cold, that they
surpass the Caspian snow, and all the ice of the
north."

—But for their spirits and souls

This word *rebellion* had froze them up
As fish are in a pond.

Second Part Henry IV. act 1. sc. 3.

Pope has several similes of the same stamp.
And hence one master passion in the breast,
Like Aaron's serpent swallows up the rest.

Epist. 2. l. 131.

And again, talking of this same ruling or master passion:
Nature its mother, Habit is its nurse;
Wit, spirit, faculties, but make it worse;
Reason itself but gives it edge and pow'r;
As heav'n's blest'd beam turns vinegar more fowr.

Ibid. l. 145.

Where the subject is burlesque or ludicrous, such similes are far from being improper. Horace says pleasantly,

Quamquam tu levior cortice.

Lib. 3. od. 9.

And Shakspear,

In breaking oaths he's stronger than Hercules.

And this leads to observe, that besides the foregoing comparisons, which are all serious, there is a species, the end and purpose of which is to excite gaiety or mirth. Take the following examples.

Falstaff, speaking to his page:

"I do here walk before thee, like a fow that
hath overwhelmed all her litter but one."

Second part Henry IV. act 1. sc. 10.

"I think he is not a pick-purse, nor a horse-
stealer; but for his verity in love, I do think him
as concave as a covered goblet, or a worm-eaten
nut."

As you like it, act 3. sc. 10.

This sword a dagger had his page,

That was but little for his age;

And therefore waited on him fo,

As dwarfs upon knights-errant do.

Hudibras, canto 1.

"Books, like men, their authors, have but one
way of coming into the world; but there are
ten thousand to go out of it, and return no more."

Tales of a Tub.

"The most accomplished way of using books at
present is, to serve them as some do lords, learn
their titles, and then brag of their acquaintance."

Ibid.

"He does not consider, that sincerity in love is
as much out of fashion as sweet stuff; no body
takes it now."

Charles's Husband.

COMPARTITION, in architecture, denotes the useful and graceful disposition of the whole ground-plot of an edifice, into rooms of office, and of reception or entertainment.

COMPARTMENT, in general, is a design composed of several different figures, disposed with symmetry; to adorn a parterre, a ceiling, &c.

A compartment of tiles or bricks, is an arrangement of them, of different colours, and varnished, for the decoration of a building. Compartments in gardening, are an assemblage of beds, plats, borders, walks, &c. disposed in the most advantageous manner that the ground will admit of. Compartments in heraldry are otherwise called partitions.

COMPASS, or *Mariner's COMPASS*, is an instrument whereby the ship's course is determined. See NAVIGATION, sect. 1. 15. and MARINER'S COMPASS.

The compass being of the utmost consequence to navigation, it is reasonable to expect that the greatest attention should be used in its construction, and every attempt to improve it carefully examined, and, if proper, adopted. But so careless are the generality of commanders of this most useful instrument, that almost all the compasses used on board merchant-ships have their needles formed of two pieces of steel-wire, each of which is bent in the middle, so as to form an obtuse angle; and their ends, being applied together, make an acute one; so that the whole represents the form of a lozenge; in the centre of which, and of the card, is placed the brass cap. Now, if we examine

mine a number of these cards, we shall rarely, if ever, find them all in the same direction, but they will all vary more or less, not only with regard to the true direction, but from one another.

These irregularities are owing to the structure of the needle ; for the wires of which it is composed are only hardened at the ends ; now, if these ends are not equally hard, or if one end be hardened up higher than the other, when they come to be put together, in fixing them to the card, that end which is hardest will destroy much of the virtue of the other ; by which means the hardest end will have the most power in directing the card, and consequently make it vary toward its own direction : and, as the wires are disposed in the form of a lozenge, these cards can have but little force, so that they will often, when drawn aside, stand at the distance of several degrees on either side the point from whence they are drawn : for all magnetical bodies receive an additional strength by being placed in the direction of the earth's magnetism, and act proportionably less vigorously when turned out of it ; wherefore, when these kind of needles are drawn aside from their true point, two of the parallel sides of the lozenge will conspire, more directly than before, with the earth's magnetism ; and the other two will be less in that direction : by which means the two sides will very much impede its return ; and the two latter will have that impediment to overcome, as well as the friction, by their own force alone.

To remove these inconveniences, some needles are made of one piece of steel of a spring temper, and broad towards the ends, but tapering towards the middle, where a hole is made to receive the cap. At the ends they terminate in an angle, greater or less according to the skill or fancy of the workman. These needles, though infinitely preferable to the other, are, however, far from being perfect ; for every needle of this form hath six poles instead of two, one at each end, two where it becomes tapering, and two at the hole in the middle : this is owing to their shape ; for the middle part being very slender, it has not substance enough to conduct the magnetic stream quite through, from one end to the other : all these poles appear very distinctly, when examined with a glass that is sprinkled over with magnetic sand. This circumstance, however, does not hinder the needle from pointing true ; but as it has less force to move the card than when the magnetic stream moves in large curves from one end to the other, it is certainly an imperfection.

These inconveniences induced the ingenious Dr Knight to contrive a new sea-compass, which is now used on board all the ships of war. The needle in this instrument is quite straight, and square at the ends ; and consequently has only two poles, though about the hole in the middle, the curves are a little confused. Needles of this construction, after vibrating a long time, will always point exactly in the same direction ; and if drawn ever so little on one side, will return to it again, without any sensible difference. We may therefore conclude, that a regular parallelopiped is the best form for a needle, as well as the simplest, the holes for the caps being as small as possible.

And as the weight should be removed to the greatest distance from the centre of motion, a circle of brass, of the same diameter of the card, may be added, which will serve also to support the card, which may then be made of thin paper, without any thing to stiffen it. This ring being fixed below the card, and the needle above it, the centre of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unnecessary.

The above observations will be easily understood from viewing the several parts of the instrument as represented on Plate LXXXIII. fig. 3. where n^o 1. is the card, with the needle K L, and its cap M, fixed upon it, being one-third of the diameter of the real card.

N^o 3, is a perspective view of the backside of the card, where A B represents the turning down of the brass edge, C the under part of the cap, D and E two sliding weights to balance the card, and F, G, two screws that fix the brass edge, &c. to the needle.

N^o 2, is the pedestal that supports the card, containing a screwing needle, fixed in two small grooves to receive it, by means of the collet C, in the manner of a port-crayon. D, the stem, is filed into an octagon, that it may be the more easily unscrewed.

Azimuth COMPASS. See AZIMUTH.

COMPASS-DIALS, are small horizontal dials, fitted in brass or silver boxes, for the pocket, to shew the hour of the day, by the direction of a needle that indicates how to place them right, by turning the dial about till the cock or style stand directly over the needle ; but these can never be very exact, because of the variation of the needle itself. See COMPASS, and DIAL-LING.

COMPASSES, or *Pair of COMPASSES,* a mathematical instrument for describing circles, measuring figures, &c.

The common compasses consist of two sharp-pointed branches or legs of iron, steel, brass, or other metal, joined together at the top by a rivet, whereon they move as on a centre.

The principal perfection of this, as of all other compasses, consists in the easy and uniform opening and shutting of their legs ; one of which may be taken out, in order to make room for others.

There are now used compasses of various kinds and contrivances, accommodated to the various uses they are intended for ; as,

COMPASSES of three Legs are, setting aside the excess of a leg, of the same structure with the common ones : their use being to take three points at once, and so to form triangles ; to lay down three positions of a map, to be copied at once, &c.

Beam COMPASSES consist of a long branch, or beam, carrying two brass cursors, the one fixed at one end, the other sliding along the beam, with a screw to fasten it on occasion. To the cursors may be screwed points of any kind, whether steel, for pencils, or the like. It is used to draw large circles, to take great extents, &c.

Caliber COMPASSES. See CALIBER.

Clockmaker's COMPASSES are joined like the com-

Compasses, *mon compasses*, with a quadrant, or bow, like the spring compasses; only of different use, serving here to keep the instrument firm at any opening. They are made very strong, with the points of their legs of well tempered steel, as being used to draw lines on paste-board or copper.

Cylindrical and Spherical COMPASSES, consist of four branches, joined in a centre, two of which are circular, and two flat, a little bent on the ends: their use is to take the diameter, thickness, or caliber of round or cylindric bodies; such as cannons, pipes, &c.

Elliptic COMPASSES consist of a cros ABGH, (plate LXXXIV. fig. 9.) with grooves in it, and an index CE, which is fastened to the cros by means of dove-tails at the points CD, that slide in the grooves; so that when the index is turned about, the end E will describe an ellipse; which is the use of these compasses.

German COMPASSES have their legs a little bent outwards, towards the top; so that when shut, the points only meet.

Lapidary's COMPASSES are a piece of wood, in form of the shaft of a plane, cleft at top, as far as half its length; with this they measure the angles, &c. of jewels and precious stones, as they cut them. There is in the cleft a little brass rule, fastened there at one end by a pin; but so that it may be moved in the manner of a brass level: with this kind of square they take the angles of the stones, laying them on the shaft as they cut them.

Proportional COMPASSES are such as have two legs, but four points, which, when opened, are like a cros, as not having the joint at the end of the legs like common compasses: some of these have fixed joints, others moveable ones; upon the legs of the latter of which are drawn the lines of chords, sines, tangents, &c. Their use is to divide lines and circles into equal parts; or to perform the operations of the sector at one opening of them.

Spring-COMPASSES, or dividers; those with an arched head, which by its spring opens the legs; the opening being directed by a circular screw fastened to one of the legs, and let through the other, worked with a nut. These compasses are made of hardened steel.

Trifecting COMPASSES consist of two central rules, and an arch of a circle of 120 degrees, immovable, with its radius; which is fastened with one of the central rules like the two legs of a sector, that the central rule may be carried through all the points of the circumference of the arch. The radius and rule should be as thin as possible; and the rule fastened to the radius should be hammered cold, to attain the greater elasticity; and the breadth of the central rule should be triple that of the radius: there must also be a groove in this rule, with a dove-tail fastened on it for its motion, and a hole in the centre of each rule. The use of this instrument is to facilitate the trifecting of angles geometrically; and it is said to have been invented by M. Tarragen for that purpose.

Turn-up COMPASSES. The body of this instrument is like the common compasses: but towards the bottom of the legs, without-side, are added two other points besides the usual ones; the one whereof carry a drawing pen point, and the other a port-crayon,

both adjusted so as to turn round, and be in the way of use, or out of it, as occasion requires. These compasses have been contrived to save the trouble of changing the points.

COMPATIBLE, something that may suit, or consist with another. See *INCOMPATIBLE*.

COMPEIGNE, a handsome town of the isle of France, in the county of Senlis, with a palace, or castle, where the king often resides. The maid of Orleans was taken prisoner here in 1430. It is seated on the river Oise, near a large forest. E. Long. 3. 12. N. Lat. 49. 25.

COMPENDIUM, in matters of literature, denotes much the same as epitome or abridgement. See *ABRIDGEMENT*.

COMPENSATION, in a general sense, an action whereby any thing is admitted as an equivalent to another.

COMPENSATION, in law. Where the same person is debtor and creditor to another, the mutual obligations, if they are for equal sums, are extinguished by compensation; if for unequal, the lesser obligation is extinguished, and the greater diminished, as far as the concurrence of debt and credit goes.

COMPETENCE, or *COMPETENCY*, in a general sense, such a quantity of any thing as is sufficient.

COMPETENCE, in law, the right or authority of a judge, whereby he takes cognizance of any thing.

COMPETENTES, an order of catechumens, in the primitive Christian church, being the immediate candidates for baptism. See *CATECHUMEN*.

COMPETITION, in a general sense, is the same with rivalry, or when two or more persons contend for the same thing.

COMPETITION, in Scots law. In escheats, see *LAW*, Part III. N^o clxvi. 17, &c. In confirmations by the superior, in resignations, and in personal rights of lands, *ibid.* clxviii. 5.—9. In inhibitions, in adjudications, amongst assignees, arresters, and pinders, *ibid.* clxxi. 6. clxxii. 3. clxxvii. 2. clxxviii. 8, 9, 10. Amongst creditors of a defunct, clxxxi. 19.

COMPITALIA, or *COMPITALITA*, feasts held among the ancients in honour of the *lares*. The word comes from the Latin *compitum*, a cross-way; by reason the feast was held in the meeting of several roads. The *compitalia* are more ancient than the building of Rome. Dionysius Halicarnassensis, and Pliny, indeed, say, they were instituted by Servius Tullus; but this only signifies that they were then introduced into Rome. The feast being moveable, the day whereon it was to be observed was proclaimed every year. It was ordinarily held on the 4th of the nones of February, *i. e.* on the 2^d of that month. Macrobius observes, that they were held not only in honour of the *lares*, but also of *mania*, madnefs. The priests who officiated at them were slaves and liberti, and the sacrifice a sow. They were re-established, after a long neglect, by Tarquin the Proud, on occasion of an answer of the oracle, that they should sacrifice heads for heads; *i. e.* that for the health and prosperity of each family, children were to be sacrificed: but Brutus, after expelling the kings, in lieu of those barbarous victims substituted the heads of garlic and poppy; thus satisfying the oracle which had enjoined

capita,

Compatible

Compitalia

Complement
+
Composite.

capita, heads. During the celebration of this feast, each family placed at the door of their house, the statue of the goddess *Mania*: they also hung up at their doors figures of wool, representing men and women; accompanying them with supplications that the lares and mania would be contented with those figures, and spare the people of the house.

COMPLEMENT, in geometry, is what remains of the quadrant of a circle, or 90°, after any certain arch has been taken away from it. Thus, if the arch taken away be 40°, its complement is 50; because 90-40=50. The sine of the complement of an arch is called the *co-sine*, and that of the tangent the *co-tangent*, &c.

COMPLETUS FLOS, in botany. A flower is said to be complete, which is provided with both the covers, *viz.* the calix or flower-cup, and the petals. The term was invented by Vaillant, and is synonymous to *calyculatus flos* in Linnaeus. Berkenhout erroneously contends it with the *austus* and *calyculatus calix* of the same author.

COMPLEX, in a more general sense, a term synonymous with compound; though, in strictness of speech, there is some difference.

Complex is properly applied where a thing contains divers others, or consists of divers parts not really distinct from each other, but only imaginarily, or in our conceptions. In this sense the soul may be said to be complex, in respect of the understanding and will, which are two things that our reason alone distinguishes in it.

Complex Term or *Idea*, is a term compounded of several simple or incomplex ones. Thus in the proposition, *A just God cannot leave crimes unpunished*; the subject of this proposition, *viz.* a just God is a complex term, or stands for a complex idea composed of two simple or incomplex ones, *viz.* God and just.

COMPLEXION, among physicians, the temperament, habitude, and natural disposition, of the body; but more often the colour of the face and skin. See *COLOUR of the Human Species*.

COMPLEXUS, and **COMPLEXUS Minor**, or *Tracheo-mastoidæus*: two muscles in the posterior part of the trunk. See *ANATOMY, Table of the Muscles*.

COMPLICATION, in general, denotes the blending, or rather interweaving, of several different things together: thus a person afflicted with several disorders at the same time, is said to labour under a complication of disorders.

COMPLINE, the last division of the Romish breviary. It was instituted to implore God's protection during the night, as the *prime* is for the day. It is recited after sunset, and is so called, because it completes the office for the 24 hours.

COMPOUND, **COMPOSE**, or **GOSONY**, in heraldry, is said of a bordure made up of angular parts, or chequers, of alternate metals and colours. See *HERALDRY, N° II. examp. 8*.

COMPOSITE, in general, denotes something compounded, or made up of several others united together; thus,

COMPOSITE Numbers, are such as can be measured exactly by a number exceeding unity; as 6 by 2 or

3, or 10 by 5, &c. so that 4 is the lowest composite number. Composite numbers, between themselves, are those which have some common measure besides unity; as 12 and 15, as being both measured by 3.

COMPOSITE Order, in architecture, the last of the five orders of columns; so called because its capital is composed out of those of the other columns, borrowing a quarter-round from the Tuscan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its cornice has simple modillions or dentils. It is also called the *Roman* or *Italic* order, as having been invented by the Romans. By most authors it is ranked after the Corinthian, either as being the next richest, or the last invented. See *ARCHITECTURE, N° 53*.

COMPOSITION, in a general sense, the uniting or putting together several things, so as to form one whole, called a *compound*.

COMPOSITION of Ideas, an act of the mind, whereby it unites several simple ideas into one conception or complex idea.

When we are provided with a sufficient stock of simple ideas, and have by habit and use rendered them familiar to our minds, they become the component parts of other ideas still more complicated, and form what we may call a second order of compound notions. This process may be continued to any degree of composition we please, mounting from one stage to another, and enlarging the number of combinations.

COMPOSITION, in grammar, the joining of two words together; or prefixing a particle to another word, to augment, diminish, or change its signification.

COMPOSITION, in logic, a method of reasoning whereby we proceed from some general self-evident truth, to other particular and singular ones.

In disposing and putting together our thoughts, there are two ways of proceeding, equally within our choice: for we may suppose the truths, relating to any part of knowledge, as they presented themselves to the mind, in the manner of investigation; carrying on the series of proofs in a reverse order, till they, at last, terminate in first principles: or beginning with these principles, we may take the contrary way, and from them deduce, by a direct train of reasoning, all the several propositions we want to establish.

This diversity, in the manner of arranging our thoughts, gives rise to the twofold division of method established among logicians; the one called *analytic* method, or the method of *resolution*, inasmuch as it traces things back to their source, and resolves knowledge into its first and original principles. This method stands in contradistinction to the method of composition; or, as it is otherwise called, the *synthetic* method: for here we proceed by gathering together the several scattered parts of knowledge, and combining them into one system, in such a manner, as that the understanding is enabled distinctly to follow truth through all the different stages of gradation.

COMPOSITION, in music, is the art of inventing, and writing airs; of accompanying them with a suitable harmony; in short, of forming a complete piece of music in all its parts.

The knowledge of melody, harmony, and its rules, is the foundation of composition. Without doubt, it

Composite
+
Composition.

Compo-
sition.

It is necessary to know in what manner chords should be filled, how to prepare and resolve dissonances, how to find the fundamental bass, and how to put in practice all the other minutiae of elementary knowledge; but with the mechanical rules of harmony alone, one is by no means better qualified to understand the art, and operate in the practice of composition, than to form himself for eloquence upon all the rhetorical precepts exhibited in grammar. We need not say, that besides this, it is necessary to understand the genius and compass of voices and instruments; to judge what airs may be of easy, and what of difficult, execution; to observe what will, and what will not, be productive of any effect; to feel the character of different movements, as well as that of different modulations, that both may be always suitably applied; to know the different rules established by convention, by taste, by caprice, or by pedantry, as fugues, imitations, or in pieces where the subject is confined to uniform laws in its harmony, melody, rhythmus, &c. All these acquisitions are still no more than preparatives for composition: but the composer must find in his own genius the sources of beautiful melody, of sublime harmony, the picturesque, and the expressive in music; he must, in short, be capable of perceiving, and of forming, the order of the whole piece; to follow the relations and aptitudes of which it is susceptible in every kind; to inflame his soul with the spirit and enthusiasm of the poet, rather than childishly amuse himself with punning in harmony, or adapting the music to each particular word. It is with reason that our musicians have given the name of *words* to the poems which they set to music. It appears evident from their manner of expressing them, that, in their apprehension, they seemed words, and words alone. One would be tempted to imagine, particularly during some of these last years, that the rules for the formation and succession of chords have caused all the rest to be neglected or forgot; and that harmony has made no acquisitions, but at the expence of what is general and essential in the musical art. All our artists know how to fill a chord with its constituent sounds, or a piece of harmony with its constituent parts; but not a soul amongst them feels a ray of composition. As to what remains, though the fundamental rules of counter-point, or music in parts, continue still the same, they are more or less rigorous and inflexible in proportion as the parts increase in number; for according as the parts are multiplied, the difficulty of composition is heightened, and the rules are less severe.—Compositions in two parts are called *duets*, when the two performers sing equally; that is to say, when the subject is no further extended, but divided between them. But if the subject is in one part alone, and the subordinate harmony no more than an accompaniment, the first part is then either called a *recitative* or a *solo*; and the other, an *accompaniment*, or *continued bass*, if it is a bass. It is the same case with the *trio*, with compositions in three, in four, or in five parts.

The name of *composition* is likewise given to such pieces of music themselves, as are formed according to the rules of the art. For this reason the *duets*, *trios*, *quartets*, which have just been mentioned, are called *compositions*.

Compo-
sition.

Compositions are either formed for the voice alone, or for instruments, or for voices and instruments joined. Full choruses and songs are the only compositions principally intended for the voice, though sometimes instruments are joined with it to support it. Compositions for instruments are intended to be executed by a band in the orchestra, and then they are called *symphonies*, *concertos*; or for some particular species of instruments, and then they are called *pieces* or *sonatas*.

Such compositions as are destined both for voices and instruments, have been generally divided into two capital species, viz. the *sacred*, and the *secular*. The compositions destined for the church, whether psalms, hymns, anthems, or responses, are in general distinguished by the name of *church-music*, and characterized by their intention to be sung with words. Secular music in general may likewise be divided into two kinds; *theatrical* and *chamber music*. Of the first kind, is that used in the operas; the subdivisions of the second are endless. Solos, concertos, cantatas, songs, and airs, almost of every kind, which are not adapted to the church or the stage, may be included in the idea of *chamber-music*.

In general, it is thought, that sacred music requires deeper science, and a more accurate observation of rules; the secular species gives more indulgence to genius, and subsists in greater variety.

But we must here observe, that the ecclesiastical music now used, or rather profaned and murdered, amongst us, though regular in its harmony, is simple in its composition, and demands not that profound knowledge in the art, either to form or comprehend it, which Rousseau whom till now, we have followed in this article, seems to imagine. His assertion can only be applicable to the church-music of Italy. That which is now established amongst us, seems not to be indigenous, but transferred with the Calvinistical liturgy from Geneva; and as it is intended for popular use, it can by no means be esteemed an high exertion of the musical art: yet, however simple, it is pleasing; and, when properly performed, might elevate the soul to a degree of devotion, and even of rapture, which at present we are so far from feeling, that we rather seem to sleep or to howl, than to sing the praise of God. Perhaps our clergy may find more advantage in cultivating their farms; but they would surely feel a higher and diviner pleasure, in cultivating the tastes and voices of their people. The one, however, is not incompatible with the other. An hour of relaxation in a winter-evening might serve for the accomplishment of this pious purpose; and one should imagine, that, independent of religious considerations, the spirit of the craft might dictate such a measure as calculated to produce popular intertainment and gain popular affection.

In composition, the author either confines himself, as a subject, to the mere mechanical modulations and arrangements of sound; and, as his end, to the pleasure of the ear alone; or otherwise he pursues a nobler height; he aspires to imitative music; he endeavours to render the hearts and souls of his auditors docile by his art, and thus to produce the noblest emotions and most salutary effects. In the first view, it is only necessary,

Composi-
tion
↓
Compositus

necessary, that he should look for beautiful sounds and agreeable chords; but in the second, he ought to consider music in its conformity with the accents of the human voice, and in the expressive powers of notes harmonically combined to signify or paint such objects as are susceptible of imitation. In Rousseau's article *opera*, some ideas may be found by which the art may be ennobled and elevated, by forming music into a language more powerful and pathetic than eloquence itself. See *OPERA*.

COMPOSITION, in literature, the art of forming and arranging sentiments, and cloathing them with language suitable to the nature of the subject or discourse. See the articles *LANGUAGE*, *ORATORY*, and *POETRY*.

COMPOSITION, in chemistry, is the union and combination of several substances of different natures, from which a compound body results. From this union of bodies of different natures, a body is formed, of a mixed nature, which Becker and Stahl have called a *mixture*, and which may be called a *combination*, or *chemical composition*, to avoid the equivocal sense of the word *mixture*. By this last, we understand only a mere apposition of parts; and which would therefore give a very false idea of chemical composition, in which a mutual adhesion takes place between the combined substances.

COMPOSITION, in painting, includes the invention as well as disposition of the figures, the choice of attitudes, &c.

Composition, therefore, consists of two parts; one of which finds out, by means of history, proper objects for a picture; and the other disposes them to advantage. See *PAINTING*.

COMPOSITION, in pharmacy, the art or act of mixing divers ingredients together into a medicine so as they may assist each other's virtues, supply each other's defects, or correct any ill qualities thereof. See *PHARMACY*.

COMPOSITION, in commerce, a contract between an insolvent debtor and his creditors, whereby the latter accept of a part of the debt in composition for the whole, and give a general acquittance accordingly.

COMPOSITION, in printing, commonly termed *compositing*, the arranging of several types or letters in the composing-stick, in order to form a line; and of several lines ranged in order, in the galley, to make a page; and of several pages to make a form. See *PRINTING*.

COMPOSITÆ, in botany. The name of a class in Hermannus and Royen; as likewise, of an order in Linnæus's fragments of a natural method, consisting in general of the plants which have the characters enumerated in the following article. A particular description of this order, is given under the article *SYNGENESIA*, which includes all the compound flowers.

COMPOSITUS FLOS, in botany, an aggregate flower composed of many *flosculi sessiles*, on a common entire receptaculum, with a common perianthium, and whose anthers being five in number unite in the form of a cylinder; the flosculi are monopetalous, and under each of them is a monospermous germen.

Compound flowers are either *ligulati*, *tubulosi*, or *radiati*. Composit.

COMPOST, in agriculture, denotes a certain kind of mixture designed to assist the soil in the way of vegetation, instead of dung. The requisites for a compost are, 1. That it ought to be cheaper than the quantity of dung required for an equal extent of soil. 2. It ought to be less bulky; and 3. It ought to produce equal effects.

Under the article *AGRICULTURE*, we have endeavoured to shew, that the true vegetable food consists in reality of the putrid effluvia proceeding from decayed animal and vegetable substances. If this theory is admitted, the hope of making composts as a succedaneum for dung is but very small, unless they are made of putrefied animal and vegetable substances, in which case, unless in very singular circumstances, they will prove much dearer than dung itself. Several attempts, however, have been made by those who had other views concerning the nature of the true vegetable food. An oil-compost is recommended in the Georgical Essays, upon a supposition that the food of vegetables is of an oily nature. It is made as follows: "Take of North-American potash 12^{lb}. Break the salt into small pieces, and put it into a convenient vessel with four gallons of water. Let the mixture stand 48 hours, then add coarse train oil 14 gallons. In a few days the salt will be dissolved, and the mixture, upon stirring, will become nearly uniform. Take 14 bushels of sand, or 20 of dry mold; upon these pour the above liquid ingredients. Turn this composition frequently over, and in six months it will be fit for use. When the liquid ingredients are put to one or two hogheads water, a liquid compost will be formed, which must be used with a water cart."

This compost, however, the inventor himself owns to be inferior to rotten dung, as indeed may very naturally be supposed; yet in some cases it seems capable of doing service, as will appear from some of the following experiments which we extract from the essays above-mentioned.

Exp. I. By the author of the essays. "I took four pots, n^o 1, 2, 3, 4. N^o 1. contained 12^{lb} of barren sand, with 1^{oz} of the sand oil compost. N^o 2. contained 12^{lb} of sand without any mixture. N^o 3. had 12^{lb} of sand with half an ounce of flaked lime. N^o 4. had 12^{lb} of sand with 4^{oz} of the sand oil-compost. In the month of March, I put six grains of wheat into each pot, and during the summer, I occasionally watered the plants with filtrated water. All the time the plants were consuming the farina, I could observe very little difference in their appearance. But after one month's growth, I remarked that n^o 1. was the best; n^o 2. the next; n^o 3. the next; and n^o 4. much the worst." The same differences were observed in August, when n^o 1. the best, had five small ears, which contained a few poor grains of wheat.

Exp. II. By the same. "In the month of June, I selected four lands of equal goodness in a field intended for turnips. The soil was a light sand, with a tolerable quantity of vegetable earth amongst it. It was plowed out of sward in November, and had not borne a crop for many years. I shall distinguish my experimental lands by n^o 1, 2, 3, 4. N^o 1. was manured with

Compost.

Compost.

with rotten dung; n° 2. with oil compost; n° 3. with lime; n° 4. was left without any dressing. On the 20th of June they were all sown with turnip-seed broadcast, and during the course of the season were twice hoed. In November I viewed the field, and made the following remarks. N° 1. the best; n° 2. the next; n° 3. the worst; n° 4. better than n° 3." Here the oil compost appears in a favourable light; but other trials, made with equal accuracy, seem rather to prove, that it is not proper for turnips, barley, or quick growing vegetables. It requires being meliorated by the atmosphere, and therefore is better adapted for winter crops.

Exp. III. by the fame. "In the month of May, I planted 12 alleys that lay between my asparagus beds with cauliflower plants. Each alley took up about 30 plants. One of the alleys I set apart, for an experiment with the oil-compost, prepared according to the directions already given. About an handful of the compost was put to the root of each cauliflower plant. In all other respects the alley was managed like the rest. The plants in general flowered very well; but those to which I applied the compost sprung up hastily with small stalks, and produced very poor flowers. I imputed this unfavourable appearance to the freshness of the compost, which was only a few weeks old. In the September following this unsuccessful experiment, I planted the same alleys with early cabbages. The necessity of meliorating the compost was in this trial fully confirmed. For the cabbages that grew upon the alley, which in May had received the compost, were larger and in all respects finer than the others."

Exp. IV. by James Stovin, Esq; of Doncaster. "In the year 1769, I made the following trial with the oil-compost, prepared as above directed. One acre sown with barley, and manured with oil-compost at 18s. produced five quarters, five bushels. An acre adjoining, sown with barley, and manured with 12 loads of rotten dung at 3l. produced four quarters three bushels and two pecks. The compost-barley was bolder and better corn than the other. In the year 1770, the dunged acre produced of rye, three quarters. The compost acre of ditto, two quarters six bushels. In the year 1771, the same lands were sown with oats, and the produce was greatly in favour of the dunged acre. These experimental lands were in a common field that had been long under the plough."

Exp. V. by Richard Townly, Esq; of Belfield. "In the spring 1770, I prepared a piece of ground for onions. It was laid out into six beds of the same size, and which were all sown at the same time. Over two of them, the oil-compost was scattered in a very moderate quantity. Over other two, pigeons dung; and over the remaining two, some of my *weed-compost*, (formed of putrefied vegetables) which I esteem one of the best manures, for most vegetables, that can be made. The onions came up very well in all the beds; but, in about six weeks, those that were fed with the oil-compost, plainly discovered the advantage they had over the rest, by their luxuriance and colour, and at the end of the summer perfected the finest crop I had ever seen, being greatly superior to the

others both in quantity and size. The same spring I made an experiment upon four rows of cabbages, set at the distance of four feet every way. Two were manured with oil-compost, and two with my own. All the plants were unluckily damaged, just before they began to form, by some turkeys getting into the field and plucking off the greatest part of the leaves. However, they so far recovered, in the September following, from 22 to 28 ^{lb} a-piece. The rows proved so equal in goodness, that I could not determine which had the advantage. The same year, one part of a field of wheat exposed to the north-east winds, which, that spring, continued to blow for a month or five weeks, appeared very poor and languid at the time of tillering. Over it I ordered some of the oil-compost to be sown with the hand; which not only recovered, but also pushed forwards the wheat plants in that part of the field, so as to make them little inferior, if any, to the rest. The same spring, I made a comparative experiment, upon four contiguous lands of oats, between the oil-compost and my own weed-compost. The latter had manifestly the advantage, though the other produced a very large and fine crop. I also tried the oil-compost upon carrots, and it answered exceedingly well. I did the same this year (1771) both upon them and my onions, and have the finest crops of these vegetables I ever saw any where upon the same compass of ground."

Exp. VI. by Mr J. Broadbent of Berwick, in Elmet near Leeds.—"On the first of October 1771, I sowed two acres of a light channelly soil with wheat, and harrowed in the compost with the grain. Being at a considerable distance from a large town, we find it very difficult and expensive to procure rotten dung in sufficient quantity for our tillage lands, for which reason we have recourse to land dressings both for our winter and spring-corn. Rape-dust and foot are principally used; but the present price of both these articles is a heavy tax upon the farmer. To obviate that inconvenience, I resolved to make trial of the oil-compost; and from what I have observed in this one experiment, I am encouraged to make a more extensive use of it the next year. Being well acquainted with the nature and efficacy of foot, I am satisfied, that the above two acres produced as good a crop of wheat as if they had been dressed with that excellent manure."

On the supposition that vegetables are supported by matters of a saline nature, composts formed of different sorts of salts have been contrived, but with less success than the one above treated of. A famous composition of this kind, was lately sold by patent, under the name of Baron Van Haak's compost. The following experiment is mentioned in the *Georgical Essays*, as made with a view to determine the virtues of it compared with the oil-compost and foot mixed with ashes.—"In the beginning of April 1773, an acre of land was sown with forward oats. I pitched upon one land in the middle of the piece, which I esteemed better than any of the rest, and upon this I scattered Baron Van Haak's compost, in the quantity directed in his instructions. On one side I manured a land with the oil-compost, but rather with a less quantity than directed; and, on the other side, I manured two lands with

Compost. with dry coal-ashes sifted fine, and an equal quantity of foot. The lands upon which this experiment was made, were much worn out with a long succession of crops. The lands which had the benefit of the ashes and foot, produced an exceeding fine crop; the oil-compost produced a tolerable good one; but that which had only the assistance of the baron's compost, produced a very poor one. It could not have been worse had it been left destitute of every assistance."

Composts, made with putrefied animal substances, will no doubt answer much better, in moist cases, than any other kind of manure, but they are difficult to be procured. The following is recommended by Dr Hunter of York.—"Take a sufficient quantity of saw-dust, incorporate it with the blood and offal of a slaughter-house, putting a layer of one and a layer of the other till the whole becomes a moist and fetid composition. Two loads of this compost, mixed with three loads of earth, will be sufficient for an acre of wheat, or spring-corn. Being a kind of top-dressing, it should be put on at the time of sowing, and harrowed in with the grain. The present year I have a field of wheat manured in this manner, and have the pleasure to say, that it is extremely clean, and has all the appearance of turning out an excellent crop. As this kind of compost lies in a small compass, it seems well adapted for the use of such farmers as are obliged to bring their manures from a distance. It is besides extremely rich, and will probably continue in the land much longer than fold-yard or stable-dung. I apprehend that it is capable of restoring worn out land to its original freshness; and I am induced to be of that opinion, from the appearance of the above crop, which is now growing upon land much impoverished by bad management."

Another compost, prepared from whales flesh, is recommended by Mr Charles Chaloner.—"I have a particular pleasure, (says he), in describing and making public the best method of forming a compost from whales flesh, as recommended to me by Dr Hunter. Having marked out the length and breadth of your intended dung-hill, make the first layer of earth about a foot in thickness. Moor-earth, or such as is taken from ant-hills, is the best for this purpose. Over the earth, lay one layer of long litter, from the fold-yard or stable, about 12 inches in thickness, then a layer of whale-flesh, and over that another layer of dung. Repeat the operations till the heap be raised about six feet, then give it a thick covering of earth, and coat the heap with fods. In this manner each layer of flesh will be placed between two layers of dung. In about a month turn the whole in the usual manner, which will occasion a strong degree of heat and fermentation. When turned, coat with earth as before, with a view to confine the putrid steam which would otherwise escape. In a month or two the heap will be found to be considerably fallen, when it should have a second turning as before. The operation of turning must be repeated at proper intervals, till the whole becomes a uniformly putrid mass. The whale-flesh is of different degrees of firmness, some of it being almost liquid; and, in proportion to its firmness, the heap will become sooner or later fit for use. In general, the compost should not be used till 12 months old; but that de-

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pends upon circumstances. Guard the heap from dogs, pigs, badgers, and vermin, as these animals are remarkably fond of whale-flesh. This animal-compost may with great advantage be applied to all purposes where good rotten dung is required. I have used it with great success for cabbages, and find it an excellent dressing for meadow-ground. According to the best computation, one hoghead of whale refuse, will make eight loads of dung, which, when we consider the great facility with which this basis of our dung-hill may be carried, is a momentous concern to such farmers as lie remote from a large town." See MANURE.

COMPOST in gardening, is a mixture of several earths, earthy substances, and dungs, either for the improvement of the general soil of a garden, or that of for some particular plants. Almost every plant delights in some peculiar mixture of soils or compost, in which it will thrive better than in others. The most remarkable and generally useful of these, are taken notice of under the description of the several botanical articles, as they occur in the order of the alphabet.

COMPOSTELLA, a celebrated town of Spain, and capital of Galicia, with an archbishop's see, and an university. The public squares, and the churches, particularly the Metropolitan church, are very magnificent. It has a great number of monasteries, for both sexes, and about 2000 houses. It is pretended that the body of St James was buried here, which draws a great number of pilgrims from most parts of Christendom. They walk in procession to the church, and visit his wooden image, which stands on the great altar, and is illuminated with 40 or 50 wax-candles. They kiss it three times, with a very respectful devotion, and then put their hats on its head. In the church there are 30 silver lamps, always lighted, and six chandeliers of silver, five feet high. The poor pilgrims are received into an hospital, built for that purpose, which stands near the church; and round it are galleries of free stone, supported by large pillars. The archbishop is one of the richest prelates in Spain, having 70,000 crowns a-year. From this town the military order of St Jago, or St James, had its original. It is seated in a peninsula, formed by the rivers Tambre and Ulla, in a pleasant plain. W. Long. 7. 17. N. Lat. 42. 54.

NEW COMPOSTELLA, a town of North America, in New Spain, and province of Xalisco, built in 1531. It is seated near the South Sea. W. Long. 110. 12. N. Lat. 21. 0.

COMPOUND, in a general sense, an appellation given to whatever is composed or made up of different things; thus we say, a compound word, compound sound, compound taste, &c.—Compound differs from *complex*, and stands opposed to *simple*. See COMPLEX and SIMPLE.

COMPOUND Flower. See COMPOSITUS Fls.

COMPOUND Interest, called also *interest upon interest*, is that which is reckoned not only upon the principal, but upon the interest itself forborn; which hereby becomes a sort of secondary principal. See INTEREST.

COMPOUND Motion, that motion which is effected by several conspiring powers. Powers are said to

12 U

conspire

Compost
Compound.

Compound
I
Compurgator.

Computa-
tion
I
Conception

conspire if the direction of the one be not quite opposite to that of the other; as when the radius of a circle is conceived to revolve about a centre, and at the same time a point to move straight along it.

COMPOUND Numbers, those which may be divided by some other number besides unity, without leaving any remainder; such are 18, 20, &c. the first being measured by the numbers 2, 6, or 9; and the second by the numbers 2, 4, 5, 10.

COMPOUND Quantities. See ALGEBRA, n° 4. **COMPOUND Ratio**, is that which the product of the antecedents of two or more ratios has to the product of their consequents. Thus, 6 to 72 is in a ratio compounded of 2 to 6, and of 3 to 12.

COMPOUND, (substantive), the result or effect of a composition of different things; or a mass formed by the union of many ingredients.

COMPRESS, in surgery, a bolster of soft linen cloth, folded in several doubles, frequently applied to cover a plaster, in order not only to preserve the part from the external air, but also the better to retain the dressings or medicines.

COMPRESSION, the act of pressing or squeezing some matter together, so as to set its parts nearer to each other, and make it possess less space. *Compression* properly differs from *condensation*, in that the latter is performed by the action of cold, the former by some external violence.

COMPROMISE, a treaty or contract, whereby two contending parties establish one or more arbitrators to judge of, and terminate their difference in an amicable manner.

COMPTON (Henry), bishop of London, was the youngest son of Spencer Earl of Northampton, and born in 1632. After the restoration of Charles II. he became cornet of a regiment of horse: but soon after quitting the army for the church, he was made bishop of Oxford in 1674; and about a year after translated to the see of London. He was entrusted with the education of the two princesses Mary and Anne, whom he also afterwards married to the princes of Orange and Denmark: and their firmness in the Protestant religion was in a great measure owing to their tutor, to whom, when popery began to prevail at court, it was imputed as an unpardonable crime. He was suspended from his ecclesiastical function by James II. but was restored by him again on the prince of Orange's invasion. He and the bishop of Bristol made the majority for filling the vacant throne with a king: he performed the ceremony of the coronation; was appointed one of the commissioners for raising the liturgy; and laboured with much zeal to reconcile dissenters to the church. His spirit of moderation made him unpopular with the clergy, and in all probability checked his further promotion. He died in 1713; but, living in busy times, did not leave many writings behind him.

COMPUCTION, in theology, an inward grief of mind for having offended God.

COMPURGATOR, one that, by oath, justifies another person's innocence. Compurgators were introduced as evidences in the jurisprudence of the middle ages. Their number varied according to the importance of the subject in dispute, or the nature of the

crime with which a person was charged.

COMPUTATION, in a general sense, the manner of estimating time, weights, measure, moneys, or quantities of any kind.

COMUS, in Pagan mythology, the god of nocturnal revels and festivals. He was represented as a young man crowned with roses or myrtle, holding in one hand a golden cup, and in the other a dish of fruit.

CONANT (Dr John), a learned English divine, born in 1608. He took his degrees at Exeter College Oxford; was, by the parliament, constituted one of the assembly of divines, though he seldom, if ever, sat with them; and in 1657 was admitted vice-chancellor of the university. On the restoration he was one of the commissioners, and assisted at the conferences in the Savoy; but was deprived by the act of uniformity: after eight years he was confirmed, and was made arch-deacon of Norwich, and prebendary of Worcester. In 1686 he lost his sight; and died in 1693; leaving a number of admired sermons, afterwards published in six volumes.

CONARION, or **CONOIDES**, a name for the pineal gland. See ANATOMY, n° 397. c.

CONATUS, a term frequently used in philosophy and mathematics, defined by some to be a quantity of motion, not capable of being expressed by any time, or length; as the *conatus recedendi ab axe mundi*, is the endeavour which a body, moved circularly, makes to recede, or fly off from the centre or axis of its motion.

CONCALE BAY, is on the coast of France in Brittany, where the English forces landed in June 1758, in order to go to St Maloes; which they did, and burnt all the ships in that harbour, which were above 100, of all sorts. Concale is the town which gives name to the bay, and is famous for oysters. It is 18 miles east of St Maloes, and 197 west of Paris. W. Long. 1. 47. N. Lat. 48. 41.

CONCARNEAU, a town of France, in Bretagne, with a harbour and a castle. E. Long. 3. 45. N. Lat. 47. 55.

CONCATENATION, a term chiefly used in speaking of the mutual dependence of second causes upon each other.

CONCAVE, an appellation used in speaking of the inner surface of hollow bodies, but more especially of spherical ones.

CONCAVE Glasses, such as are ground hollow, and are usually of a spherical figure, though they may be of any other, as parabolic, &c. All objects seen through concave glasses, appear erect and diminished.

CONCENTRATION, in general, signifies the bringing things nearer a centre. Hence the particles of salt, in sea-water, are said to be concentrated; that is, brought nearer each other, by evaporating the watery part.

CONCENTRIC, in mathematics, something that has the same common centre with another: it stands in opposition to *excentric*.

CONCEPTION, among physicians, &c. denotes the first formation of an embryo in the womb of its parent, who, from that time, becomes pregnant. See GENERATION.

Conception
Conception

CONCEPTION *Immaculate* of the holy virgin, is a feast established in honour of the holy virgin, particularly with regard to her having been conceived and born *immaculate*, i. e. without original sin, held in the Romish church on the 8th of December. The immaculate conception is the great head of controversy between the Scotists and Thomists; the former maintaining, and the latter impugning it. In the three Spanish military orders, of St James of the sword, Calatrava, and Alcantara, the knights take a vow at their admission to defend the immaculate conception. This reformation was first taken in 1652. Peter d'Alva has published 48 huge volumes in folio on the myteries of the conception.

CONCEPTION, an episcopal town of Chili in South America. It is situated in W. Long. 79. 12. S. Lat. 36. 43; and is the oldest European settlement in Chili, and the second in point of dignity. On their first settlement here, the Spaniards were repeatedly driven off by the Indians, so that they were obliged to take up their residence at St Jago. Since that time both the cities of Conception and St Jago have been frequently destroyed by earthquakes. In the year 1730 both of them were laid in ruins by a dreadful shock, the first concussions of which were attended with an unusual swelling of the sea, that overturned the few houses which had escaped the ravages of the earthquake. The harbour is good, and pretty much frequented, on which account the city is regarded as a place of consequence. The king allows annually 350,000 pieces of eight for the support of a garrison of 3500 men; a corps that is seldom complete. None of the fortifications are considerable; but those towards the land are wretched. The Spaniards now live in tolerable security with respect to the Indians, and have no notion of any attack from the land side. It is said indeed, that not only this but all the settlements in Chili and Peru would fall an easy prey to the attacks of a foreign enemy; the fortifications being in ruins, and the garri- sons scarce half the number required by the king: owing to the avarice, ignorance, and supine negligence of the governors, who study nothing but to enrich themselves.

CONCEPTION, a town of North America, in New Spain, and in the Audience of Guatimali. It is seated near the sea-coast, 100 miles west of Porto-bello, and a small river that runs into the sea. W. Long. 83. 5. N. Lat. 10. 0.

CONCERT, or **CONCERTO**, in music, a number or company of musicians, playing or singing the same piece of music or song at the same time.

CONCERTATO intimates the piece of music to be composed in such a manner, as that all the parts may have their recitatives, be it for two, three, four, or more voices or instruments.

CONCERTO GROSSI, the grand chorus of a concert, or those places where all the several parts perform or play together.

CONCESSION, in general, signifies either the act of granting or yielding any thing, or the thing itself which is so granted or yielded.

CONCESSION, in rhetoric, a figure, whereby something is freely allowed, that yet might bear dispute, to obtain something that one would have granted to

him, and which he thinks cannot fairly be denied, as in the following conceffion of Dido, in Virgil:

"The nuptials he disclaims, I urge no more;

"Let him pursue the promis'd Latian shore.

"A short delay is all I ask him now;

"A pause of grief, an interval from wo."

CONCHA, in zoology, a synonyme of the **MYTILUS**, **SOLE**, &c.

CONCHES, a town of Normandy, with a Benedictine abbey, which carries on a considerable trade. It is seated on the top of a mountain, in the territory of Ouche, 45 miles north-west of Paris. E. Long. 0. 51. N. Lat. 48. 58.

CONCHITES **MARMOR**, a name given by the ancients to a species of marble dug near Megara, and remarkable for containing a great number of sea-shells, and other marine bodies immersed in it.

CONCHOID, in geometry, the name of a curve, given to it by its inventor Nicomedes. See **FLUXIONS**.

CONCHYLIA, a general name for all petrified shells, as limpets, *cochleæ*, nautilus, conchæ, lepadæ, &c.

CONCIATOR, in the glass art, is, for the crystal-glass, what the founder is at the green-glass houses. He is the person that weighs and proportions the salt on ashes and sand, and works them with a strong fire till they run into lumps and become white; and if the metal be too hard, and consequently brittle, he adds salt or ashes, and if too soft, sand; still mixing them to a fit temper, which is only known by the working.

CONCINNOUS INTERVALS, in music, are such as are fit for music, next to, and in combination with concords; being neither very agreeable nor disagreeable in themselves; but having a good effect, as by their opposition they heighten the more essential principles of pleasure; or as, by their mixture and combination with them, they produce a variety necessary to our being better pleased.

CONCINNOUS System, in music. A system is said to be concinnous, or divided concinnously, when its parts, considered as simple intervals, are concinnous; and are besides placed in such an order between the extremes, as that the succession of sounds, from one extreme to the other, may have an agreeable effect.

CONCLAVE, the place in which the cardinals of the Romish church meet, and are shut up, in order to the election of a pope.

The conclave is a range of small cells, 10 feet square, made of waincot: these are numbered, and drawn for by lot. They stand in a line along the galleries and hall of the Vatican, with a small space between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the constitutions of the church allow the cardinals to make choice of such a place for the conclave as they think most convenient; yet it is generally held in the Vatican.

The conclave is very strictly guarded by troops: neither the cardinals, nor any person shut up in the conclave, are spoke to, but at the hours allowed of, and then in Italian or Latin; even the provisions for the conclave are examined, that no letters be conveyed by that means from the ministers of foreign powers, or other persons who may have an interest in the election of the pontiff.

Concession
Conclave

Conclave
Concretion.

Concubinage
Conde.

CONCLAVE is also used for the assembly, or meeting, of the cardinals shut up for the election of a pope.
CONCLUSION, in logic, the consequence or judgment drawn from what was asserted in the premises; or the previous judgments in reasoning, gained from combining the extreme ideas between themselves.

CONCOCTION, in medicine, the change which the food undergoes in the stomach, &c. to become chyle. See **CHYLE**.

CONCOMITANT, something that accompanies or goes along with another.

CONCORD, in grammar, that part of construction called *syntax*, in which the words of a sentence agree; that is, in which nouns are put in the same gender, number, and case; and verbs in the same number and person with nouns and pronouns.

CONCORD, in music, the relation of two sounds that are always agreeable to the ear, whether applied in succession or consonance.

CONCORDANCE, a sort of dictionary of the Bible, explaining the words thereof in alphabetical order, with the several books, chapters, and verses quoted, in which they are contained.

CONCORDANT VERSES, such as have several words in common; but which, by the addition of other words, convey an opposite, at least a different meaning. Such are those,

Et cavis in silva { *venatur* } & *omnia* { *servat*.
lupus } { *naturitur* } { *vasiat*.

CONCORDIA, a town of Italy, in the duchy of Mirandola; seated on the river Secchia, 5 miles west of Mirandola, and 15 miles south-east of Mantua; subject to the house of Austria. E. Long. 11. 22. N. Lat. 44. 52.

CONCORDIA, a Pagan divinity of the Romans. She had a temple on the declivity of the capitol; another in the portico of Livia; and a third on Mount Palatine, built of brass by Cn. Flavius, on account of a vow made for reconciling the senate and people. She was pictured with a cup in her right hand; in her left was sometimes a sceptre, and sometimes a cornucopia. Her symbols were two hands joined, as is seen in a coin of Aurelius Venus, and another of Nero; also two serpents twisting about a caduceus.

CONCOU, in botany, a name given by the people of Guinea to an herb, which is in great esteem among them for killing that troublesome sort of worm called the *Guinea-worm*, that breeds in their flesh. They bruise the leaves, and mixing them with oil, apply them in form of a cataplasm.

CONCRETE, in the school-philosophy, an assemblage or compound.

CONCRETE, in natural philosophy and chemistry, signifies a body made up of different principles, or any mixed body: thus, soap is a factitious concrete, mixed together by art; and antimony is a natural concrete, or a mixed body compounded in the bowels of the earth.

CONCRETION, the uniting several small particles of a natural body into sensible masses, or concretes, whereby it becomes so and so figured and determined, and is endued with such and such properties.

CONCRETION is also the act whereby soft bodies are rendered hard; or an insensible motion of the

particles of a fluid or soft body, whereby they come to a confluence. It is indifferently used for induration, condensation, congelation, and coagulation.

CONCUBINAGE, denotes sometimes a criminal or prohibited commerce between the two sexes; in which sense it comprehends adultery, incest, and simple fornication: but, in a more limited sense, it signifies the cohabitation of a man and woman in the way of marriage, without having passed the ceremony thereof.

CONCUBINE, a woman whom a man takes to cohabit with after the manner of a wife, without being authorized thereto by a legal marriage.

CONCUPISCENCE, according to divines, an irregular appetite, or lust after carnal things, inherent in the nature of man ever since the fall.

CONDE (Lewis de Bourbon prince of), was born at Paris Sept. 7. 1621. He was styled Duke d'Enguien, till he succeeded to the title of Prince of Conde by his father's death in 1646. As he was of a tender and delicate constitution, the prince sent him to the castle of Montfond in Berry, that he might breathe a more pure and salutary air. Here he was educated in his infancy by some experienced and prudent citizens wives. When he was of a proper age, the prince took upon himself the task of governor, and appointed for his assistant M. de la Bouffieres, a private gentleman, a man of honour, fidelity, and good nature, and who made it a rule to observe inviolably the orders that were given him. Two Jesuits distinguished for their genius and knowledge were also given him for preceptors. He formed him a household of 15 or 20 officers, all men of the greatest virtue and discretion.

With these attendants the duke d'Enguien went to settle at Bourges, where he frequented the college of Jesuits. Here, besides the ordinary studies, he was taught ancient and modern history, mathematics, geography, declamation; also riding and dancing, in which last he soon excelled. He made such a surprising progress, that before the age of 13 he defended in public some questions in philosophy with incredible applause. At his return from Montfond, he had for his tutor M. de Merille; a man deeply versed in the knowledge of common law, of ancient and modern laws, of the holy scriptures, and of the mathematics. Under his direction the duke went through that new course with prodigious success. He acquired a critical taste in the arts and sciences, which he retained all his life; he never suffered a day to pass without dedicating two or three hours at least to reading; his thirst for knowledge was universal, and he endeavoured to search every thing to the bottom. His chief inclination, however, lay towards the military art; and at the age of 18 he obtained permission to make his first campaign as a volunteer in the army commanded by M. de la Meilleraye. This campaign was unfortunate; and the duke d'Enguien was only a witness of the marshal's imprudence and disgrace. Nevertheless, in this campaign he laid the foundation of that renown which made him after-wards considered as the greatest general of his age.

On his return to Paris, the duke waited upon cardinal Richelieu at Ruel. That minister was so pleased with

with his conversation, that he soon after made proposals of an alliance with the prince of Conde, by marrying the duke d'Enguien to Claire Clemence de Maille Broza, the cardinal's niece. The duke consented to this match out of obedience to his father; but the force he put upon himself by yielding to it was so great, that he fell dangerously ill. It was long before he got the better of his distemper; but at length he not only recovered, but became so strong as afterwards to bear the greatest fatigues with ease.

The duke made two more campaigns as a volunteer; the one under the marshal de la Meilleraye, the other in the army of Lewis XIII. which conquered Rouffillon. In 1643, at the age of 22, he obtained from the king, at the persuasion of cardinal Mazarine, the command of the army destined to cover Champagne and Picardy; which command was confirmed to him after the king's death by the queen regent, Anne of Austria, to whose interest he was strongly devoted. In this station, though he never had been present at any battle, he soon gave such a specimen of his abilities as crowned him with glory. The Spaniards who threatened France with an invasion, were defeated by him at Rocroi; and this signal victory made him from that time considered as the guardian genius of his country. He next formed the project of besieging Theonville, and proposed it to the council of regency. They consented with fear and distrust; but the duke carried it into execution with such skill, activity, and courage, that he became justly the subject of general admiration. In two months time Theonville surrendered. At length, having covered Alsace and Lorraine from the enterprises of the Imperialists, the duke returned to Paris, where he obtained the government of Champagne, and of the city of Stenai.

The three following years were little more than a series of military operations. The three battles of Fribourg, in which the duke d'Enguien triumphed over Velt Marhal count de Mercy, the greatest general in all Germany; the taking of Philippsbourg, and a great number of other places, which rendered him master of the palatinate, and of the whole course of the Rhine; the victory of Nortlingue, by which he revenged the viscount du Turenne's defeat at Mariendal; the siege and conquest of Dunkirk; the good and bad success of his arms in Catalonia, where, though he was forced to raise the siege of Lorida, he kept the Spaniards in awe, and cut to pieces their rear guard: these are the principal events which distinguish the campaigns of 1644, 1645, and 1646.

The victories of the duke d'Enguien, his great reputation and esteem with the people, began now to give umbrage to Mazarin. The cardinal's dislike to him appeared on the death of the duke de Breze, admiral of France. The prince of Conde earnestly demanded for his son the duke de Breze's places. But Mazarin, afraid of increasing the wealth and power of a prince whom his victories and the love and confidence of the people and the army had already rendered too formidable to him, evaded his request, by persuading the queen to take the admiralty to herself. On the death of his father, the minister's dislike to the young prince of Conde became still more apparent.

By the minister's persuasion he had accepted of the command of the army in Catalonia; but, on his arrival at Barcelona, he found neither troops, money, artillery, provisions, nor ammunition. Enraged at this deception, he vented his resentment in bitter complaints and severe threats; but by the resources that he found in this dilemma, the prince added new lustre to his glory.

The campaign of 1648 was as glorious to Conde as those which preceded it had been. To disconcert at once the projects of the archduke Leopold, the prince resolved to attack him even in the heart of the Low Countries; and notwithstanding the considerable difficulties which he had to surmount, he besieged the important city of Ypres, and took it in sight of all the enemies' forces.

Notwithstanding this success, Conde saw himself at the point of experiencing the greatest reverse of fortune. His army was a prey to scarcity, to nakedness, contagious distempers, and desertion. For eight months it received no supply from the minister, but half a muster. Every thing was supplied by the prince himself; he lavished his money, and borrowed more to supply his troops. When it was represented to him that he was in danger of ruining himself by such an enormous expence, he replied, that "since he every day ventured his life for the service of his country, he could very well sacrifice his fortune to it. Let but the government exist, (added he), and I shall want for nothing."

The French army having been reinforced by 4000 of the troops of Weimar, Conde attacked the Spaniards advantageously encamped near Lens, and gained a complete victory over them, which disabled them from attempting any thing more, and even from supporting themselves. Afterwards he besieged Furnes, the garrison of which, 500 men, surrendered themselves prisoners of war. But the prince was wounded there in the trenches by a musket-shot above the right hip; and the contusion was so great, that he was forced to submit to several incisions.

The French court, animated with the victory at Lens, thought this a proper time to take vengeance on the factions which for some time had violently agitated the kingdom; and accordingly imprisoned Broussel and Blancmenil, two of the principal leaders of the country party. This vigorous proceeding, however, occasioned a general revolt. Two hundred thousand men took arms in Paris, barricaded the streets, invested the palais-royal, and demanded the prisoners. It was necessary to release them; but from that time the regal authority was annihilated; the queen was exposed to a thousand insults, and Mazarin dared no longer venture out of the palais-royal. In this embarrassment the queen recalled the prince of Conde, as the only one from whom she could hope for support. He retired to Ruel, whither the regent had gone with the young king and Mazarin. Anne of Austria proposed to him the reducing of Paris by force of arms; but he calmed the resentments of that princess; and instead of being accessory to her vengeance, he directed all his views to pacify the kingdom, and at length brought about an accommodation between the parties, who desired it with equal ardour. But
new

Conde.

new incidents soon rekindled the combustions. The treachery of Mazarin, and the artifices of the leaders of the country party, occasioned new cabals and fresh troubles. Conde was cared by the leaders of both parties; but at last, enraged at the arrogance of the malcontents, who every day formed new pretensions, he took part openly with the court, though he thought it ungrateful, and protected the minister, though he did not esteem him.

The royal family, the duke of Orleans, Conde, and Mazarin, left Paris privately in the night between the 5th and 6th of January 1649, and went to St Germain. The parliament sent deputies to learn from the queen herself the reasons of her departure, and to beg her to name the citizens whom she suspected, that they might be tried. Mazarin had the imprudence to dismiss them without any answer. Exasperated at this, the people again took up arms in order to defend themselves against the enterprizes of the court, who had determined to block up and to starve the capital, in order to suppress the party of malcontents. With 7 or 8000 men, the broken relics of the last campaign, the prince of Conde formed a design of reducing above 500,000 intrenched behind walls. He had neither money nor magazines; he saw himself in the depth of a most severe winter; nevertheless he triumphed over Paris, and this great success completed his glory. It did him so much the more honour, as during the siege he constantly defeated the troops of the malcontents; he prevailed on the army that marched to their assistance under Turenne, to abandon that general; he stopped the progress of the duke de Longueville, who had caused an insurrection in Normandy; and got the start of the Spaniards, who were advancing to give him battle.

Conde de Retz, co-adjutor of Paris, and afterwards cardinal, was the life and soul of the revolvers, and directed all their motions. He had taken Catiline for his model; and was equally intrepid and capable of the greatest actions; of an exalted genius, but governed by his ambition. He distinguished his hatred to Mazarin by arming the malcontents; and he himself raised at his own expence a regiment which he called the regiment of *Corinth*: as soon as this corps took the field during the blockade of Paris, it was defeated and dispersed. This check was called "the first to the Corinthians." The peace was signed at St Germain; but neither party carried its point, and scarce any one but Conde acquired glory by this war. After the conclusion of the treaty, the prince repaired to the capital, and traversed all the streets in his coach alone. All persons of any consequence paid their compliments to him, and the parliament sent a solemn deputation to thank him for the peace to which he had so powerfully contributed. The people, however, made loud complaints on account of the king's absence (for the court was not yet returned to Paris), and the malcontents gave reason to apprehend a new insurrection. Conde encouraged the king and queen to return; and at length brought them to Paris, amidst the acclamations and blessings of the public.

The important service which Conde had just done the court intitled him to the acknowledgements of the queen, and especially of Mazarin; but the dark foul

of that cardinal only remembered it to punish a too fortunate and too powerful protector. He privately swore the prince's destruction; at least that he should give the whole kingdom a pattern of submission and dependence on his will. However, not to excite the public indignation, he still kept up appearances with the prince, while he secretly spread about him disgusts, suspicions, snares of every kind, and the most heinous calumnies. The ungrateful minister deceived the prince by making him the most flattering proposals; and with the most alluring promises which he always found means to avoid fulfilling. The enraged prince despised the minister, and treated him with disdain. After this they were reconciled again only to be again at variance. Each of them in their turn courted the country party, in order to make it subservient to their designs. At last Mazarin thought of an expedient, which but too effectually answered his purpose, of making an irreconcilable quarrel between that party and the prince. There was among the malcontents, one marquis de la Boulaie, a man of an infamous character, who had obtained the confidence of the party by false appearances of hatred to the cardinal, but who secretly kept up a correspondence with him. It is pretended that he made him an offer of privately killing Conde. Mazarin was charmed with the proposal; yet he only required Boulaie to exhibit all the proofs of an assassination, and to act in such a manner that every thing might concur to render the country party suspected of that crime. He was punctually obeyed; the coach was stopped; some pistols were fired at it, by which two of the footmen were dangerously wounded; and, after that shameful exploit, la Boulaie took refuge in the hotel of the duke of Beaufort, who was the hero of the party, in order no doubt to countenance the prince's suspicion of the malcontents. Luckily, Conde was not in his coach when it was stopped; the cardinal had spread the report of his intended assassination; and in concert with the queen and the prince he had prevailed to have the coach sent away empty, to prove the reality of the attempt. Mazarin counterfeited a zeal for the prince's life; he furiously declaimed against the malcontents, who, he pretended, had made an attempt on a life so precious to the state; and he inflamed Conde's resentment against the duke of Beaufort and the coadjutor, whom he supposed to be the authors of this heinous outrage. The prince was so strongly prejudiced, that he refused to hear them when they appeared before him to justify themselves. He demanded justice against them of the king; he formally accused them before the parliament, and remained inflexible in spite of the pains which the leaders of the party took to demonstrate to him that he had been imposed upon. However, the affair was brought before the parliament; the accused defended themselves, and the coadjutor, who had discovered the cardinal's secret, unmasked him so well, that the prince agreed to a private negotiation with the malcontents; he required nothing more than the coadjutor's leaving Paris, but with the rank of ambassador to Rome or Vienna. That prelate would have consented to it, to satisfy Conde, if Mazarin, some days after, had not given him the choice of any recompence, in order to engage

Conde.

his

his concurrence in the prince's destruction. Affairs were now in such a dangerous situation, that the cardinal saw clearly it was necessary to hasten to the winding up of the plot. Master of the queen's mind, which he guided as he pleased; and sure of having inflamed against Conde, all the resentment of the malcontents; he fought and obtained, by means of the duchess Chevreuse, the support of that powerful faction, which connected itself the more readily with him, in hopes that the prince's fall would soon enable it to crush without difficulty the cardinal himself. The coadjutor had private conferences with the queen, and the minister. Conde had notice of it; and in order to discover if it were true, he endeavoured to surpise it from Mazarin's own mouth. "Cardinal, (said he, one day), it is publicly reported that you have nightly meetings with the coadjutor, disguised like a trooper." He accompanied this speech with a quick and penetrating look; but the cardinal, who was a perfect master of dissimulation, answered him in such a free, artless like manner, that he entirely removed Conde's apprehensions; and he slighted the information he had received, of the plot forming against him.

Mazarin wanted nothing but the support of the duke of Orleans; and at last found means, by the duchess of Chevreuse, to enflame the jealousy of that fickle and inconstant prince, and to engage him to consent to the imprisonment of Conde. Having thus united all parties, and fearing no other obstacle, this ungrateful and perfidious minister made preparations for privately arresting the prince; the order for it was signed January 18th 1650. Conde having that day repaired as usual to the palais-royal, to assist at council with the prince of Conti and the duke of Longueville, the queen gave orders to arrest them all three, and convey them without any noise to the castle of Vincennes. She was instantly obeyed, and the princes were strictly guarded in that prison.

In this unexpected reverse of fortune, the fortitude and greatness of Conde's mind appeared only the more remarkable. Confined with the other two princes in the tower of Vincennes, where neither supper, furniture, nor beds were provided, he contented himself with two new laid eggs, and threw himself in his cloaths, on a truss of straw, where he slept 12 hours without waking. He still retained his cheerfulness, and dedicated the greatest part of his time to reading, the rest to conversation, playing at battle-door and shuttlecock, to bodily exercises, and the cultivation of flowers.

Mazarin triumphed at the disgrace of the princes, proscribed all those who were attached to Conde, and behaved in the most insolent and arbitrary manner. The prince's friends, however, notwithstanding their being strictly watched, found means to keep up a punctual correspondence with him. They made various attempts to release him: they raised troops; in particular, the dukes of Bouillon and Rochefoucault, and the viscount de Turenne. The princes of Conde engaged the province of Guienne to declare in his favour; she made war, in order to force the court to release him; at length the partisans of the prince signed a treaty with the Spaniards, to labour in concert for his enlargement. But all these efforts would, perhaps, have

been ineffectual, if other more powerful resources had not been employed.

In that gallant and warlike age, every thing was managed by the passions and intrigues of five or six women, who possessed the confidence of the leaders of the state, and of the various parties. The princess of Mantua, wife to one of the sons of the elector Palatine, king of Bohemia, principally directed the counsels in the party of the princes. She found means to reconcile the duke of Orleans, the coadjutor, and the malcontents with the friends of the prince, and united their efforts against the cardinal. The parliament, on the other side, loudly demanded the release of the prisoners. All the orders of the state united in soliciting it, inasmuch that the queen was at last prevailed on to give her consent. At this news, Mazarin was so confounded, that he fled in the disguise of a trooper, and arrived at the gates of Richlieu, where a body of horse waited for him. The parliament, informed by the queen of his flight, thundered forth an *arret*, by which he was obliged to leave the kingdom, with his family and foreign servants, in the space of 15 days, under the penalty of being exposed to a criminal prosecution. The queen desired to follow him with the king; but the nobles and burghers invested the palais-royal, and prevented the execution of this project, which would have kindled a civil war. Mazarin, therefore, perceiving that it was impossible for the queen to join him, determined to get himself to restore the princes to their liberty, and to go the start of the deputies who were coming to acquaint them with it. On his arrival at Havre, he informed the princes that they were free; he entreated Conde's friendship; and was so abject as to prostrate himself at the feet of him whom he had so basely oppressed. Conde gave him a polite reception, and spoke to him in a free and cheerful tone; but tired with the mean submissions which the cardinal lavished upon him, he left him without making any promise, and set out on his return to Paris, which he entered as it were in triumph, amidst the acclamations of all orders of men, and the demonstrations of a most sincere and general joy.

After this a civil war ensued, in which the prince of Conde sided with the malcontents. Being pressed by the king's army, he retired into the suburbs of St Anthony, where he behaved with the utmost bravery; when the citizens opened their gates and received him in; and a peace ensued soon after. His hatred of the cardinal, however, made him quit Paris, and take refuge among the Spaniards, who made him generalissimo of their forces; and he took Rocroi. The peace of the Pyrenees restored him to his country; and he again signalized himself at the head of the king's armies. Being afflicted with the gout he refused the command of the army in 1676, and retired to Chartilly, where he was as much esteemed for the virtues of peace, as he had been before for his military ones. He died in 1686, at Fontainebleau.

CONDE, a town of the French Netherlands, in the province of Hainault, with the title of a principality, and a castle. It is one of the strongest towns in this country, and seated near the confluence of the rivers Haine and Scheld. E. Long. 3. 29. N. Lat. 50. 27.

CONDE, a town of France, in Normandy, and in the

Condemnation the Bessin, which carries on a considerable trade; seated on the river Nereau. W. Long. o. 37. N. Lat. 48. 50.

Conditional

CONDEMNATION, the act of giving judgment, passing or pronouncing sentence against a person subjected thereby to some penalty or punishment, either in respect of life, reputation, or fortune.

CONDENSATION, the act whereby a body is rendered more dense, compact, and heavy. The word is commonly applied to the conversion of vapour into water, by distillation, or naturally in the clouds. The way in which vapour commonly condenses, is by the application of some cold substance. On touching it, the vapour parts with its heat which it had before absorbed; and on doing so, it immediately loses the proper characteristics of vapour, and becomes water. But though this is the most common and usual way in which we observe vapour to be condensed, nature certainly proceeds after another method: since we often observe the vapours most plentifully condensed when the weather is really warmer than at other times. See the articles *CLOUD*, *EXPANSION*, *EVAPORATION*, *VAPOUR*, &c.

CONDENSER, a pneumatic engine, or syringe, whereby an uncommon quantity of air may be crowded into a given space; so that sometimes ten atmospheres, or ten times as much air as there is at the same time, in the same space, without the engine, may be thrown in by means of it, and its egress prevented by valves properly disposed. See plate LXXIV.

It consists of a brass cylinder, wherein is a moveable piston; which being drawn out, the air rushes into the cylinder through a hole provided on purpose; and when the piston is again forced into the cylinder, the air is driven into the receiver through an orifice, furnished with a valve to hinder its getting out.

The receiver or vessel containing the condensed air, should be made very strong, to bear the force of the air's spring thus increased; for which reason they are generally made of brass: its orifice is fitted with a female screw to receive the male screw at the end of the condenser.

If glass be used for a condenser, it will not suffer so great a degree of condensation; but the experiment will be more entertaining, since the subject may be viewed in the condensed air.

CONDITION, in the civil law, a clause of obligation stipulated as an article of a treaty or a contract; or in a donation of a testament, legacy, &c. in which last case a donee does not lose his donative if it be charged with any dishonest or impossible conditions.

CONDITIONAL, something not absolute, but subject to conditions.

CONDITIONAL Conjunctions, in grammar, are those which serve to make propositions conditional; as *if*, *unless*, *provided*, &c.

CONDITIONAL Propositions, in logic, such as consist of two parts connected together by a conditional particle.

CONDITIONAL Syllogism, a syllogism where the major is a conditional proposition. Thus,

If there is a God he ought to be worshipped.

But there is a God;

Therefore he ought to be worshipped.

The Arminian divines maintain that all the decrees of God relating to the salvation and damnation of man are truly conditional; and the Calvinists, that they are absolute.

CONDOM, a town of Gascony in France, capital of the Condomois, with a bishop's see. It is but a poor place, and the trade is very small. It is seated on the river Gelisse, in E. Long. o. 22. N. Lat. 44.

CONDOR, or **CONTOR**, in ornithology. See *VULTUR*.

CONDOMIENTES, in church-history, religious sectaries, who take their name from lying all together, men and women, young and old. They arose in the 13th century, near Cologne; where they are said to have worshipped an image of Lucifer, and to have received answers and oracles from him.

CONDRIEU, a town of Lyonnais in France, remarkable for its excellent wines. It is seated at the foot of a hill near the river Rhone, E. Long. 4. 33. N. Lat. 45. 28.

CONDUCTOR, in surgery, an instrument which serves to conduct the knife in the operation of cutting for the stone, and in laying up sinules and fistulas.

CONDUCTORS, in electrical experiments, are those bodies that receive and communicate electricity; and those that repel it are called *non-conductors*.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid.

There are several subterraneous conduits through which the waters pass that form springs. Artificial conduits for water are made of lead, stone, cast-iron, potter's earth, timber, &c.

CONDYLOID and **CORONOID Processes**. See *ANATOMY*, n^o 25. b.

CONDYLOMA, in medicine, a tubercle, or callous eminence which arises in the folds of the anus, or rather a swelling or hardening of the wrinkles of that part.

CONDYLUS, a name given by anatomists to a knot in any of the joints, formed by the epiphyfis of a bone.

CONE, in geometry, a solid figure, having a circle for its base, and its top terminated in a point or vertex. See *CONIC SECTIONS*.

Melting CONE, in chemistry, is a hollow cone formed of copper or brass, with a handle, and with a flat bottom adjoining to the apex of the cone, upon which it is intended to rest. Its use is to receive a mass of one or more metals melted together, and cast into it. This mass, when cold, may be easily thook out of the vessel, from its figure. Also, if a melted mass consisting of two or more metals, or other substances not combined together, be poured into this vessel, the conical figure facilitates the separation of these substances according to their respective densities. The cone ought to be well heated before the melted mass is thrown into it; that it may not contain any moisture, which would occasion a dangerous explosion. It ought also to be greased internally with tallow, to prevent the adhesion of the fluid matter.

CONE of Rays, in optics, includes all the several rays which fall from any radiant point upon the surface of a glass.

CONE, in botany. See *CONUS*.

CONESSI,

Condom
Cone.

Confessi
Confession.

CONESSI, a sort of bark of a tree, which grows on the Coromandel coast in the East Indies. It is recommended in a letter to Dr Monro, in the Medical Effays, as a specific in diarrhæas. It is to be finely pulverized, and made into an electuary with syrup of oranges. The bark should be fresh, and the electuary new made every day, or second day, otherwise it loses its astringent but grateful bitterness on the palate, and its proper effects on the intestines.

CONFECTION, in pharmacy, signifies, in general, any thing prepared with sugar: in particular it imports something preserved, especially dry substances. It also signifies a liquid or soft electuary, of which there are various sorts directed in dispensaries. See PHARMACY, n^o 883.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled or prepared with sugar or honey, to dispose them to keep, and render them more agreeable to the taste.

CONFEDERACY, in law, is when two or more persons combine to do any damage to another, or to commit any unlawful act. Confederacy is punishable, though nothing be put in execution; but then it must have these four incidents: 1. That it be declared by some matter of profecution, as by making of bonds or promises to one another; 2. That it be malicious, as for unjust revenge; 3. That it be false, *i. e.* against the innocent; and, lastly, That it be out of court, voluntary.

CONFERVA, RIVER-WEED; a genus of the order of algae, belonging to the cryptogamia class of plants. There are 21 species, most of them growing on stones in slow streams, on the sides of cisterns, or in ponds.

CONFESSION, in a civil sense, a declaration or acknowledgement of some truth, though against the interest of the party who makes it; whether it be in a court of justice, or out of it. It is a maxim, that in civil matters, the confession is never to be divided, but always taken entire. A criminal is never condemned on his simple confession, without other collateral proofs; nor is a voluntary extrajudicial confession admitted as any proof. A person is not admitted to accuse himself, according to that rule in law, *Non auditur perire volens*. See ARRAIGNMENT.

CONFESSION, among divines, the verbal acknowledgement which a Christian makes of his sins.

Among the Jews it was the custom, on the annual feast of expiation, for the high-priest to make confession of sins to God in the name of the whole people: besides this general confession, the Jews were enjoined, if their sins were a breach of the first table of the law, to make confession of them to God; but violations of the second table were to be acknowledged to their brethren. The confession of the primitive Christians were all voluntary, and not imposed on them by any laws of the church; yet private confession was not only allowed, but encouraged.

The Romish church requires confession not only as a duty, but has advanced it to the dignity of a sacrament: this confession is made to the priest, and is private and auricular; and the priest is not to reveal them under pain of the highest punishment.

CONFESSION of Faith, a list of the several articles of belief in any church.

Confessi-
onal
Confag-
ration.

CONFSSIONAL, or CONFESSORY, a place in churches under the great altar, where the bodies of deceased saints, martyrs and confessors, were deposited.

This word is also used by the Romanists for a desk in the church where the confessor takes the confessions of the penitents.

CONFESSOR, in the Romish church, a priest who is empowered to receive the confession of penitents, and to give them absolution.

CONFIGURATION, the outward figure which bounds bodies, and gives them their external appearance; being that which, in a great measure, constitutes the specific difference between bodies.

CONFIRMATION, in a general sense, the act of ratifying or rendering a title, claim, report, or the like, more sure and indisputable.

CONFIRMATION, in law, a conveyance of an estate, or right in *esse*, from one man to another, whereby avoidable estate is made firm and unavoidable, or a particular estate is increased, or a possession made perfect.

CONFIRMATION, in theology, the ceremony of laying on of hands, for the conveyance of the Holy Ghost.

The antiquity of this ceremony is, by all ancient writers, carried as high as the apostles, and founded upon their example and practice. In the primitive church, it used to be given to Christians immediately after baptism, if the bishop happened to be present at the solemnity. Among the Greeks, and throughout the East, it still accompanies baptism: but the Romanists make it distinct independent sacrament. Seven years is the stated time for confirmation: however, they are sometimes confirmed before, and sometimes after that age. The person to be confirmed has a god-father and god-mother appointed him, as in baptism. The order of confirmation in the church of England, does not determine the precise age of the persons to be confirmed.

CONFISCATION, in law, the adjudication of goods or effects to the public treasury; as the bodies and effects of criminals, traitors, &c.

CONFLAGRATION, the general burning of a city, or other considerable place.

This word is commonly applied to that grand period or catastrophe of our world, when the face of nature is to be changed by fire, as formerly it was by water. The ancient Pythagoreans, Platonists, Epicureans, and Stoics, appear to have had a notion of the conflagration: though whence they should derive it, unless from the sacred books, is difficult to conceive; except, perhaps, from the Phœnicians, who themselves had it from the Jews. Seneca says expressly, *Tempus advenit quo sidera sideribus incurant, et omni flagrante materia uno igne; quicquid nunc ex depositis, lucet, ardebit*. This general dissolution the Stoics call *καταστροφή, εκπύρωσις*. Mention of the conflagration is also made in the books of the Sibyls, Sophocles, Hyllaspes, Ovid, Lucan, &c. Dr Burnet, after F. Tachard and others, relates that the Siamese believe that the earth will at last be parched up with heat; the mountains melted down; the earth's whole surface reduced to a level, and then consumed with fire. And the Bramins of Siam do not only hold that the world shall be destroyed by fire; but also, that a

Confluent
Confucius.

new earth shall be made out of the cinders of the old. Various are the sentiments of authors on the subject of the conflagration; the cause whence it is to arise, and the effects it is to produce. Divines ordinarily account for it metaphysically; and will have it take its rise from a miracle, as a fire from heaven. Philosophers contend for its being produced from natural causes; and will have it effected according to the laws of mechanics. Some think an eruption of the central fire sufficient for the purpose; and add, that this may be occasioned several ways, *viz.* either by having its intention increased; which, again, may be effected either by being driven into less space by the encroachments of the superficial cold, or by an increase of the inflammability of the fuel whereon it is fed: or by having the resistance of the imprisoning earth weakened; which may happen, either from the diminution of its matter, by the consumption of its central parts, or by weakening the cohesion of the constituent parts of the mass by the excess of the defect of moisture. Others look for the cause of the conflagration in the atmosphere; and suppose, that some of the meteors there engendered in unusual quantities, and exploded with unusual vehemence, from the concurrence of various circumstances, may effect it, without seeking any further. The astrologers account for it from a conjunction of all the planets in the sign Cancer; as the deluge, say they, was occasioned by their conjunction in Capricorn. Lastly, others have recourse to a still more effectual and flaming machine, and conclude the world is to undergo its conflagration from the near approach of a comet in its return from the sun.

CONFLUENT, among physicians, &c. an appellation given to that kind of SMALL-POX wherein the pustules run into each other.

CONFORMATION, the particular consistence and texture of the parts of any body, and their disposition to compose a whole.

CONFORMATION, in medicine, that make and construction of the human body, which is peculiar to every individual.

Hence, a *mala conformatio* signifies some fault in the first rudiments; whereby a person comes into the world crooked, or with some of the viscera or cavities unduly framed or proportioned. Many are subject to incurable asthma's, from a too small capacity of the thorax, and the like vitiations conformations.

CONFORMITY, in the schools, is the congruency, or relation of agreement between one thing and another: as between the measure, and the thing measured; the object, and the understanding; the thing, and the divition thereof, &c.

CONFRONTATION, the act of bringing two persons in presence of each other, to discover the truth of some fact which they relate differently.

The word is chiefly used in criminal matters; where, the witnesses are confronted with the accused; the accused with one another, or the witnesses with one another.

CONFUCIUS, a Chinese philosopher, who lived about 500 years before our Saviour's birth, in the kingdom of Lu, now called the province of Xantung. His wit and judgment got him a reputation from his

very youth; and being a mandarin, and employed in the government of the kingdom of Lu, his profound knowledge of morals and politics made him be greatly admired. Notwithstanding his care, his prince's court was much disordered, and Confucius finding the king would not listen to his advice, quitted the court and taught moral philosophy with such applause that he soon had above 3000 scholars, whereof 72 surpassed the rest in learning and virtue, for whom the Chinese have still a particular veneration. He divided his doctrine into four parts, and his scholars into four classes: the 1st order was of those who studied to acquire virtue; the 2^d, those who learned the art of reasoning well; the 3^d studied the government of the state, and the duty of magistrates; the 4th were wholly taken up in noble discourses of all that concerned morals. In spite of all his pains to establish pure morality and religion, he was nevertheless the innocent cause of their corruption. It is said, that when he was complimented upon the excellency of his philosophy, he replied, that he felt greatly short of the perfect degree of virtue; but that in the west, the most holy was to be found. This made a strong impression on the learned; and in the 66th year after Christ's birth, the emperor Mun-ti sent ambassadors toward the west to seek this holy man. They stopped at an island near the Red-sea, and found a famous idol named Fohi, representing a philosopher that lived 500 years before Confucius. They carried this idol back with them, with instructions concerning the worship rendered to it; and so introduced a superstition that abolished in several places the maxims of Confucius. His tomb is in the academy where he taught, near the town Xio-fu, upon the banks of the river Xu. This philosopher has been in great veneration in China above 2000 years; and is still so esteemed, that each town has a palace consecrated to his memory. There was one of his descendants who was very considerable in the kingdom in 1646, whom Xanchi king of Tartary, who then conquered China, received with a great deal of honour. All those of his family are mandarins by birth; and have a privilege common with the princes of the blood, not to pay any tribute.

CONFUSION, in a general sense, is opposed to order; in a perturbation whereof, confusion consists: *e. gr.* when things prior in nature do not precede; or posterior do not follow, &c.

In a logical sense, confusion is opposed to distinctness, or perspicuity; and may happen, either in words, as when misconstrued or misapplied; or in ideas, as when the idea of any thing presents something along with it, which does not properly belong to that thing. See IDEA, and NOTION.

In a physical sense, confusion is a sort of union or mixture by mere contiguity.—Such is that between fluids of contrary nature, as oil and vinegar, &c.

CONFUSION, in Scots law, is a method of suspending and extinguishing obligations. See LAW, Part III. N^o clxxxvi. 8.

CONFUSION of Tongues. By this phrase is generally understood that miraculous interposition of the Deity mentioned in the book of Genesis, to cause mankind desist from their attempt to build the tower of Babel, and

Confucius
Confusion.

Confusion. and to makè them separate, and divide themselves into different nations.

It hath been much disputed whether there were more languages than one before the flood; and many arguments have been adduced by learned men on both sides. This question, however, it is easy to see, can never be determined; but whether it was so or not, it is plain there must have been but one for some time after the flood, as all mankind were descended from one family. As to the confusion of tongues and dispersion of mankind, it is an event mentioned by profane as well as the sacred historians*. They write that mankind used one and the same language till the overthrow of the tower of Babylon; at which time a multiplicity of tongues was introduced by the gods; whereupon wars ensued, and those whose speech happened to be intelligible to one another, joined company, and seized the countries they chanced to light upon.

* Universal History, Vol. I. p. 347.

With regard to the manner, however, in which this confusion was effected, there is a great variety of sentiments. Several learned men, prepossessed with an opinion that all the different idioms now in the world did at first arise from one primitive language to which they may be reduced, and that the variety which we find among them is no other than what must naturally have taken place in so long course of time, have thence been induced to believe that there were no new languages formed at the confusion, but that the most that was done at that time was only to set the builders of Babel at variance with one another by creating a misunderstanding among them. This some imagine to have been effected without any immediate influence on their language; which seems contrary to the words and obvious intention of the sacred historian. Others have imagined it brought about by a temporary confusion of their speech, or rather of their apprehensions, causing them, while they continued together, and spake the same language, yet to understand the words differently. A third opinion is, that a variety of inflexions was introduced, and perhaps some new words, which disturbed and perverted the former manner of expression. But this, though it might occasion different dialects, yet could not create new languages; and seems not to answer the intention of Moses, which was to inform us not only how mankind were at first dispersed into so many nations, but to account for their different languages; a thing very difficult if not impossible to be done, without having recourse to the immediate interpolation of divine power. For though time, intercourse with foreign nations, commerce, the invention and improvement of arts and sciences, and the difference of climates, cause very considerable alterations in languages; yet the utmost effect we can imagine them to have will not come up to the point in question. Upon the whole, therefore, it seems most probable, that on the confusion at Babel there were new languages formed; and that these languages were the roots of all others that are, that have been, or that will be spoken while the world remains.

In what manner these new languages were formed, is a matter not easy to be determined. From the manner in which this event is related by Moses, some

have concluded that God effected it by immediately inducing an oblivion of their former tongue, and instantaneously infusing others into their minds. The Jews imagined this to be done by the ministry of angels, 70 of whom descended with God, and were each of them set over a nation, to whom they taught a peculiar language; but that the ancestors of the Jewish nation retained the primitive language. Others have supposed, that God did no more than cause them to forget their old language, leaving them to form new ones in the best manner they could; but this must have taken up some time, and could but ill have answered the necessities of mankind; and the way in which Moses expresses himself seems to imply that it was done instantaneously.

As to the number of different languages formed at this time, we are no less in the dark than as to the manner in which they were formed. It is most probable, that the languages of the chief families were fundamentally different from each other, and that the sub-languages or dialects within each branch, for the sake of immediate intercourse, had a mutual affinity, some more, and some less, according as they settled nearer or farther from each other; which was sufficient to bring about the designs of God, divide mankind into distinct societies, and open a new scene of Providence, by which his wisdom might display itself in the government of the world.

CONGE', in the French law, a licence, or permission, granted by a superior to an inferior, which gives him a dispensation from some duty to which he was before obliged. A woman cannot obligate herself without the *conge* or licence of her husband; a monk cannot go out of his convent, without the *conge* of his superiors.

CONGE' d'*lire*, in ecclesiastical polity, the king's permission royal to a dean and chapter in the time of a vacancy, to chuse a bishop; or to an abbey, or priory, of his own foundation, to chuse their abbot or prior.

The king of England, as sovereign patron of all archbishops, bishops, and other ecclesiastical benefices, had of ancient time free appointment of all ecclesiastical dignities, whensoever they chanced to be void; investing them first *per baculum & annulum*, and afterwards by his letters-patent; and in course of time he made the election over to others, under certain forms and limitations, as that they should at every vacation, before they chuse, demand the king's *conge d'*lire**, and after the election crave his royal assent, &c.

CONGE', in architecture, a mould in form of a quarter round, or a cavetto which serves to separate two members from one another; such as that which joins the shaft of the column to the cincture, called also *apophyse*.

CONGES are also rings or ferrels formerly used in the extremities of wooden pillars, to keep them from splitting, afterwards imitated in stone-work.

CONGELATION, or FREEZING, is a term used to denote the transition of certain substances from a fluid to a solid form. Though equally applicable to the hardening of melted metals, it is seldom used in this case; as their consolidation, though attended with a

Conge'
Congela-
tion.

Congela-
tion.

certain degree of cold, yet leaves them possessed of an intense heat; and therefore, the term which is used to express the hardening of water, &c. which is attended with a very great degree of sensible cold, seems not so proper in common language.

I
Different
degrees of
cold required
to freeze dif-
ferent li-
quors.

Various degrees of cold are required for the congelation of different fluids. Water congeals when Fahrenheit's thermometer stands at 32° above 0; vinegar, when it sinks to 27° ; wine, when it sinks to 20° ; but brandy cannot be frozen till it has sunk to 7° below 0, and weak spirit of wine does not consolidate till it has sunk to 33° . Mercury requires a still greater degree of cold, such as in this country we can have no conception of. In fact, this substance having been found to retain its fluidity under the greatest degrees of cold, known not only in this country, but in every other, it was till very lately considered as essentially fluid.

2
Quickfil-
ver frozen.

Mr Brawn, however, at Petersburg, where very severe frosts are often felt, thought of making an experiment how far the quicksilver in the thermometer might be made to sink, by plunging it into a freezing mixture, while the cold was at its most extreme degree in that rigorous climate. Accordingly, one day while the frost was so intense that the thermometer stood at 40° below 0, he plunged it into a mixture of snow and spirit of nitre; upon which the quicksilver descended to 352° , and then became stationary. Upon removing the thermometer into a warm room, he observed, that it remained there 12 minutes before it began to rise; which made him suspect that the mercury had actually been frozen. To be convinced whether or not this was the case, he repeated the experiment, and when the quicksilver had again become stationary, he broke the glass, and found that it had really assumed a solid form, was perfectly flexible, and bore several strokes of a hammer.

In making this experiment he remarked, that the quicksilver descended regularly to 148° , after which it remained stationary for a little, and then would suddenly descend 100° at once. From this Dr Black conjectures, that 148° below 0 is the freezing point of quicksilver. The subsequent irregular descent of the mercury he attributes to the contraction of the solid metal in the act of congelation; for after it had descended this length, it would suddenly descend by starts, a great number of degrees at once. In this he is the more confirmed, that Mr Brawn had one thermometer, the quicksilver of which did not become solid; notwithstanding which, it would not descend below 148° .

3
Phenomena
exhibited
by water
during its
congelati-
on.

Though every known substance, and water as well as others, suffers a remarkable diminution in bulk on being exposed to a cold air; yet after water is arrived at the freezing point, the consolidation which then instantly takes place in some part of it, makes it suddenly expand about $\frac{1}{4}$ of its original bulk; which expansion is found to be owing to an innumerable quantity of small bubbles with which the ice is filled. On thawing a piece of ice under an exhausted receiver, these bubbles rise to the top of the liquid, and then break; but do not affect the mercurial gage of the air-pump in the least. What is more remarkable, though water will freeze when the thermometer sinks as low as 32° , yet if it is suffered to remain absolutely at rest,

it may be cooled to a considerable degree below this: but the moment it is touched or shaken, part of it is converted into ice; and what is still more strange, it now becomes warmer than before, the thermometer rising immediately to 32° degrees.

The action of congelation is always instantaneous, and appears very similar to the crystallization of salts. It is greatly promoted by plunging the liquor to be frozen into a mixture of snow and salt, spirit of nitre, or marine acid, and salt, &c.; and no substances have been found to retain their fluidity when exposed to the intense cold produced by these mixtures, except spirit of wine in its strongest state, ether, and the bituminous oil called *naphtha*. (See COLD.)

Concerning the manner in which the congelation of water is produced, there have been various suppositions; some reckoning it to be occasioned merely by the deprivation of a certain quantity of sensible heat; others by the introduction of some extraneous matter, which they distinguished by the name of *frigorific particles*, and supposed them to be of a saline, acid, or nitrous nature.

This last hypothesis hath been adopted by Mr Muschenbroek; who is of opinion that these particles insinuate themselves between the parts of the water, and thus stop their motion, by which means the water loses its fluidity. His reasons are as follow.

1. All bodies contract, or are condensed, on becoming solid: but water, when frozen, is expanded to about $\frac{1}{4}$ of its bulk; which shews that something extraneous has been introduced into it.

2. It hath been observed by Reaumur in France, Huxham at Plymouth, &c. that the thermometer would sometimes stand at 36° all the time of a severe frost.

3. He has observed flowers of steel when the thermometer stood at 30° ; which indicates the existence of frigorific particles in the air; and which being attracted by the water contained in it, froze the vapour.

4. He has often seen hoar-frost upon vegetables, as trees and the leaves of plants, when no ice was to be seen upon lakes and ponds, by which he imagines the same attraction of frigorific particles to be shown.

5. He has often seen a frosty night in March, April, or even June, after a warm clear day, and a good breeze of wind. He could not see how this wind could so much cool the ground; he rather supposes that it brought frigorific particles along with it.

6. It has been observed to freeze hard in some parts, when there was but a little slight frost in others situated as far north.

7. Ice-water is extremely hard: he therefore supposes, that it contains some matter which communicates this hardness to it; and this he cannot imagine to be any thing else than the frigorific particles imbedded in the air, and by which it was frozen.

8. The quickness of the production of ice on stagnating water, is not in proportion to the coldness, as may be shown by a thermometer; so he supposes it must depend on some other circumstances.

9. Water may be made to retain its fluidity, though cooled below its ordinary freezing point, provided it is kept in perfect rest and tranquillity, and in a small vessel;

Congela-
tion.

4
Accounted
for by Mr
Muschen-
broek.

Congela-
tion.

vessel; but if it is disturbed in that state, it freezes instantly.

10. A wet cloth sometimes freezes when hung in the air, when there is no ice elsewhere. This does not always succeed; and when it does, Mr Muschenbroek thinks it depends on the preference, or the attraction, or congelation or frigorific particles.

11. If a mixture of salt and snow is put over a fire, and a bowl with some water placed in the middle of it; while the salt and snow are melted into a liquid, the water will be frozen into a mass of ice. This he considers as a plain proof that the fire drives the congelating particles from the mixture into the bowl that contains the water: and he thinks it very absurd that the congelation should depend merely on the diminution of heat; for how can the heat of the fire, by entering the snow, produce any diminution of heat in the water?

All these reasons are answered, and most of them very satisfactorily, by Dr Black. Indeed, if we except the 1st, the 9th, and the 11th, there is none of them from which any conclusion can reasonably be formed concerning the cause of congelation either by frigorific particles, or any thing else. Mr Muschenbroek's last reason is shewn by the doctor to be a mere juggle; for placing the apparatus on the fire is by no means conducive to the success of the experiment, but the contrary. The salt and snow would congeal the water, though kept at a distance from the fire; and the power of this mixture to produce cold is so great, that even the setting it over the fire does not hinder the water from being frozen.

The most puzzling circumstance attending the congelation of water, is its expansion. This, however, is now explained by Dr Black in a satisfactory manner, who proves that it is owing to an extrication of air from the water. His experiment in proof of this is, to freeze water in Florence flasks. The thinness of the glass of which those vessels are formed, gives them a degree of flexibility, by which they sometimes yield so much to the expansive power of water in the act of congelation, that a Florence flask full of water may be completely frozen without being broke. When this is the case, and the vessel is inverted, and set in a warm place, the bubbles, to which the water owed its expansion when congealed, will ascend to the top, where they manifestly discover themselves to be air by forming one large bubble, which after some time is absorbed by the water. Their not affecting the mercurial gage of the air-pump, he thinks is owing to the small quantities of liquid that have been made use of in these experiments.

The doctor's theory, by which he accounts for the congelation of water, as well as the conversion of it into steam, is very ingenious and satisfactory. See EVAPORATION. He is of opinion, that all fluidity depends, not upon that quantity of heat contained in any substance which makes it sensibly warm to the touch, or by which it affects a thermometer, but on a certain quantity taken into the innost essence or composition of the body, so as to become an essential part of itself.

The easiest method of conceiving these two different states of the element of fire or heat, is by mixing

a quantity of powdered salts with water. For some time the salt will remain undissolved, and render the fluid opaque when shaken. In that state it represents sensible heat, or the element of fire combined with the fluid in such a manner as to affect a thermometer, or to make it sensibly warm. When the salt is dissolved, the fluid then becomes transparent, and the salt invisible; so that it cannot be known by the eye, whether any salt exists there or not. In like manner, when the element of fire enters into the solid ice, so as to render it fluid, it becomes imperceptible to the touch, and only discovers itself by communicating a part of its own subtilty and fluidity to the ice.

That this actually is the case, he proves from its being possible to cool water below the freezing point, provided it is suffered to remain at rest; and from its raising the thermometer to 32°, immediately upon the congelation taking place. Indeed the sudden increase of heat cannot be accounted for on any other supposition whatever. The water having more of its sensible heat carried off than is sufficient to keep the latent heat from breaking out, it instantly leaves some part of the water wherewith it was conjoined, and heats the whole to a certain degree.

From some experiments made by Dr Black, mentioned in a letter from him to Sir John Pringle, and published in the Philosophical Transactions, water is shewn to freeze sooner after it has been boiled than when it has not. The difference, however, he supposes to consist in this, that the unboiled water may be cooled down to a few degrees below the freezing point without losing its fluidity, provided it is suffered to remain perfectly at rest; but the unboiled water begins to freeze as soon as it is cooled down to 32°. If unboiled water, however, is kept continually stirring, he thinks it would begin to freeze full as soon: for though a considerable quantity of ice was formed on the boiled water, while the other remained perfectly fluid; yet, upon stirring the latter, it immediately froze, and the ice was formed on it in as great quantity as the former.

The reason of this difference appears to the doctor to be as follows. The congelation of common water is hastened by disturbing it; and as in boiling water the air is expelled from it, (see AIR), it begins to imbibe the air which it has lost, as soon as it is exposed to it. By this absorption the boiled water is continually exposed to the action of a disturbing cause, viz. the entrance of the air into it, to which the other is not; and, therefore, it is impossible to make boiled water in the least colder than 32°, without some part of it being formed into ice. In this opinion he is confirmed by some experiments of Fahrenheit's; who having put some water purged of its air into little glass globes, and sealed them up, he was surprized to find them continue much longer unfrozen than he expected; but the moment they were opened, or the glass shaken in the least, the congelation took place.

The force with which ice expands in the act of congelation is prodigious. Huygens, in order to try it, filled a cannon, whose sides were an inch thick, with water; and then closed the mouth and touch-hole, so that none could escape. The instrument thus

Congela-
tion.

6
Water most
easily frozen
when previously
boiled.

7
Prodigious
expansive
power of
freezing
water.

filled

5
by Dr
Black.

Congela- tion.	C O N [2190]	C O N	Congela- tion.
	<p>filled was then exposed to a strong freezing air. In less than 12 hours the water was frozen, and expanded with such violence as to burst the piece in two different places. At Peterburgh, in the winter of 1749, an iron bomb was burst by water turned into ice. Various other attempts have been made to calculate the expansive force of ice. A strong cylindrical box of metal was filled with water, well purged of its air by boiling and the air-pump. Being then fitted exactly with a metalline cover, between which and the water a wet leather was interposed, it was strongly pressed down with four iron-screws. The box being then placed in a freezing mixture, the water was frozen into a solid mass in less than half an hour; and as its bulk increased, three of the screws were forced off by the violence of the pressure, and the cover was raised up on one side about a quarter of an inch above the rim. This experiment having proved ineffectual to determine the power of expansion by frost, it was repeated in a different form. The cover of the box, instead of being screwed down, was pressed upon by the shorter arm of a very strong lever, which was compounded with two others, in such a manner that when a weight of 28 lb. was hung on the extremity of the most remote lever, the short arm of the first pressed upon the cover of the box with a force equal to 2296 lb. The water in the box being then made to freeze, it overcame the whole strength of the machine. The Florentine academicians have been the only persons who succeeded in their endeavours to overcome this expansive power. Being desirous of knowing what degree of strength was requisite to overcome the expansive power of a spherule of ice one inch in diameter, they procured a hollow sphere of brass, the sides of which were an inch thick, which was exactly the diameter of the hollow within. Having filled this with water, and folded up the small hole by which it was introduced, they exposed it to the cold of a freezing mixture, but the globe did not burst. They then gave it to a turner, who pared off something from the thickens. Having again exposed it to the cold, it still continued whole; but, on paring it a second time, and then exposing it to the severe cold of a freezing mixture, it burst, notwithstanding it still continued so thick as to require a force (according to Mr Muschenbroek's calculation) of 27,720 pounds, near 14 tons, to tear it asunder: and, even here, a doubt may be suggested, whether the great thickens of the sides did not prevent the action of the freezing mixture from congealing the water contained in the globe, till it was pared down sufficiently to let the cold have an effect. It is also to be considered, that cold diminishes the toughness of metallic substances, rendering them much more brittle; and consequently the brass globe could not, when exposed to the cold of a freezing mixture, require so much force to burst it, as it would have done in a moderate warmth.</p>	<p>In general, the ice of northern countries is much harder than that of the more southern climates. The reason of this probably is, that though a great quantity of the latent heat is exhaled by such a degree of cold as is necessary to produce ice, yet it is not wholly so; in consequence of which, the ice still shows, by its softness, some disposition to fluidity, which gradually lessens as the cold exerts more of the latent heat; and the ice grows still harder by being more and more exposed to severe frost.</p>	<p>8 Hardness of ice in the northern countries.</p>
	<p>During the severe frost of 1740, a palace of ice was built at Peterburgh after the most elegant model, and the justest proportions of Augustan architecture. It was 52 feet long, and 20 feet high. The materials were quarried from the surface of the river Neva; and the whole stood glittering against the sun with a brilliancy almost equal to his own. Six cannons of ice, two bombs and mortars, all of the same materials, were planted before this extraordinary edifice. The cannon were three pounders; they were charged with gun-powder, and fired off. The ball of one of them pierced an oak plank two inches thick, at 60 paces distance, and the piece did not burst with the explosion.</p>	<p>In melting of ice, if it be laid upon some substances it melts faster than upon others. It melts sooner in a silver plate than on the palm of the hand, and sooner upon copper than any other metal whatever. It melts sooner in water than in air of an equal temperature; sooner in water a little warm, than in air near the fire where it is hotter. It is sooner dissolved in vacuo than in the atmosphere. If it takes 20 minutes to dissolve in the open air, only four will be requisite to melt it in vacuo.</p>	<p>9 Melts more easily on some substances than others.</p>
	<p>Where the summer heats are great, ice becomes an article of luxury; and is indeed exceedingly salutary by preventing, in some measure, the bad effects of these heats on the human body. A ready way of making ice where none is naturally formed, or of preserving it in summer where it is formed in small quantity in the winter time, is, in some countries, eagerly sought after. The snowflakes with which ice melts furnishes an easy method of preserving it. Water, congealed in six minutes, will not resume its fluidity in some hours: (See FLUIDITY.) Nothing more then is requisite to preserve ice, than to bury it to a small depth in the ground, and cover it with a sufficient quantity of thatch to keep out the external heat. Though water placed in such a situation would always retain its fluidity, yet the great quantity of heat absorbed by ice in thawing prevents the dissolution of any considerable quantity of it, where large masses are put together.</p>	<p>If snow or pounded ice (but snow is preferable) be mixed with any salt, such as copperas, alum, salt-petre, or common salt, in the proportion of four pounds of snow to one of salt, the mixture will soon melt; but at the same time grow so much colder, that if a small basin of water is set into it, it will soon be frozen. In this case the congelation begins from the bottom upwards, which is contrary to what happens when water is frozen in the open air. Of all the different kinds of salts, sal-ammoniac is found to be most efficacious in producing ice; but it is said that water may be frozen without any salt whatever. For this purpose</p>	<p>10 Is easily preserved.</p>
	<p>Freezing is much more expeditiously carried on where the liquor is little disturbed, than if it is greatly so; though an absolute tranquillity, as we have already seen, is prejudicial to this operation. In such a case, if the water is disturbed, though by a warm air, it will be congealed in an instant.</p>		<p>11 Artificial freezing mixtures.</p>

Congela-
tion.

pose we need only to fill a small deep pewter-dish with water; and upon that place a common pewter-plate filled, but not heaped, with snow, so that the bottom of the pewter-plate may be in contact with the water. Bring this small apparatus near the fire, and as the snow melts on being stirred, the water will be frozen on the back of the plate. This experiment deserves well to be considered, as it would strongly indicate an actual expulsion of cold as a substance from snow, upon its melting by the heat of the fire. It is similar to one of Geoffroy's, which shews that cold is produced by throwing burning coals into water. See COLD, n° 5.

Though any kind of salt produces a great degree of cold on being mixed with snow, yet the pure acids of nitre and sea-salt have been found more efficacious in this respect than any known substances. Of these, spirit of nitre produces the most violent degree of cold, and spirit of sea-salt the most lasting.

But by methods of this kind ice can only be made from being in possession of some quantity of it, or of snow, already. In those countries, therefore, where no ice is ever formed naturally, it could never be procured, and in those it is most desirable. Boerhaave gives a method of making ice without either ice or snow. He directs, at whatever season of the year this is attempted, to procure the coldest water that can be got. This is to be mixed with salt in the proportion of three ounces to a quart. Of all saline substances, sal-ammoniac is found to answer best. Another quart of water is to be prepared in the same manner. The solution of the salt will make the water in each much colder than before. They are then to be mixed together. Other two quarts of water prepared and mixed in the same manner are to be added to these. The whole of this operation is to be carried on in a cold cellar; and a glass of common water is then to be placed in the vessel of liquor thus artificially cooled, which will be turned into ice in the space of 12 hours.

A process for making ice in the East Indies, without the assistance of snow or salt of any kind, has been communicated to the Royal Society by Sir Robert Barker, F. R. S. The places where this method is followed lie between 25° and 23° degrees of north latitude, where natural ice is seldom or never seen. The following method is used in freezing the water. On a large open plain three or four excavations are made, each about 30 feet square and two feet deep. The bottoms are strewn about eight inches or a foot deep with sugar-cane, or the stems of the large Indian corn dried. Upon this bed are placed in rows, near to each other, a number of small shallow earthen pans, for containing the water to be frozen. These are unglazed; scarce a quarter of an inch thick; and so porous, that the water visibly penetrates them. Towards the dusk of the evening they are filled with soft water which has been boiled, and then left in the aforesaid situation. The ice-makers usually attend the pits before the sun is above the horizon. They collect in buckets what is frozen by pouring the whole contents of the pans into them, and thereby retaining the ice, which is daily conveyed to the grand receptacle or place of preservation. This is generally prepared on some high dry situation, by sinking a pit of 14 or 15 feet deep, lined first with straw, and then

with a coarse kind of blanketing, where it is best down with rammers, till at length its own accumulated cold again freezes and forms it into one solid mass. The mouth of the pit is well secured with straw and blankets from the external air, and a thatched roof is thrown over the whole.

The quantity of ice depends materially on the weather; and consequently it sometimes happens that no congelation takes place; at other times perhaps half the quantity will be frozen, and often the whole contents will be formed into a solid cake. The more clear and serene the weather, and the lighter the atmosphere, the more favourable it is for congelation. A frequent change of winds and clouds are certain preventatives; so that in a very sharp cold night, scarce any ice will often be formed, while the whole contents will be frozen through when the night has been sensibly warmer.

The author of this account is of opinion, that water by being placed in such a situation, free from receiving any heat from other bodies, may be made to freeze in a pretty warm air, by having large surfaces exposed to it. The reason of this seems to be, that some part of its sensible heat is perpetually flying off by its insensible evaporation. The spongy substances on which the pans are set are but ill adapted to furnish it with a new supply; for, of all others, either heat or cold is most difficultly transmitted through bodies of this kind. The evaporation of the liquid which transudes through the pores of the earthen vessels, undoubtedly serves also to increase the cold; and thus the more, on account of the extreme thinness with which it is spread over them.

That ice is capable of multiplying itself, seems very probable from an observation of Sir Robert Barker's; namely, that when it is collected by the East Indians, in the manner above described, it becomes capable, by being mixed with salt, of freezing more water, or other kinds of fluids, and that during the severe heats of the summer season. The sherbets, creams, or whatever other fluids are intended to be frozen in this manner, are inclosed in silver cups containing about a pint; having their covers well luted on with paste, and placed in a large vessel filled with ice, salt-petre, and common salt; of the two last an equal quantity, and a little water is added to dissolve the whole. By this composition the contents of the cups are immediately frozen to the consistence of the ice creams in Europe; but plain water will become so hard as to require a mallet and knife to break it. Upon applying a thermometer to one of these lumps of ice, it has been known to sink two or three degrees below the freezing point; which shews, that even in the warmest climates a very great degree of cold may be produced: for the hardness of ice is always in proportion to the degree of cold to which it is exposed; and if it is internally cooled to 2 or 3 degrees below the freezing point, we are sure that a violent degree of cold has been exerted upon it externally; for the usual temperature of ice when first frozen, is 32 degrees.

CONGER, in zoology. See MURENA.

CONGERIES, a constellation or aggregate of several particles or bodies united into one mass.

CONGESTION, in medicine, a mass, or collection

Congela-
tion.12
Boerhaave's method of making ice.13
Method of doing it in the East Indies.

Congius of humours, crowded together and hardened in any part of the body, and there forming a preternatural tumor.

Congestion is effected by little and little ; in which it differs from *defluxion*, which is more sudden.

CONGIUS, a liquid measure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or fix sextarii. The congius in English measure contains 2,070,676 solid inches ; that is, seven pints, 4,942 solid inches.

CONGLOBATE GLAND. See ANATOMY, n^o 391.

CONGLOMERATE GLAND. *Ibid.*

CONGLOMERATE *Flowers*, are those growing on a branching foot-stalk, to which they are irregularly but closely connected. This mode of inflorescence, as Linnæus terms it, is opposed to that in which the flowers are irregularly and loosely supported on their foot-stalks, hence termed a *diffuse panicle* *. The term is exemplified in several of the grasses, particularly in some species of the *poa*, fescue grass, and agrostis.

CONGLUTINATION, the gluing or fastening any two bodies together by the intromission of a third, whose parts are visciduous and tenacious, in the nature of glue. See GLUE.

CONGO, a kingdom of Africa, bounded on the north by the river Zair, or Zarah, which divides it from Loanga ; on the south by the river Danda, which separates it from Angola ; on the east by the kingdoms of Fungono and Metamba, and the burnt mountains of the sun, those of crystal or salt-petre and silver, or (according to Anthony Cavazzi, a late traveller into those parts) by the mountains of Coanza Ber-bela, and the great mountain of Chilandia or Aquilonda ; and on the west by that part of the Atlantic ocean called the Ethiopic sea, or the sea of Congo. According to these limits, Congo Proper extends about three degrees from north to south ; lying between 6° and 9° S. Lat. ; but widens in its breadth inland, by the course of the river Zair, which runs winding above two degrees more to the north. Its length from east to west is very uncertain, as no observations have been taken of the exact situation of those mountains which bound it.

The history of this kingdom affords but few interesting particulars. Before its discovery by the Portuguese, the history is altogether uncertain and fabulous, as the inhabitants were totally unacquainted with letters and learning. So little were they acquainted with chronology, that it is said they did not even distinguish between day and night ; much less could they compute their time by moons or years ; and therefore could remember past transactions only by saying they happened in such a king's reign.

The country was discovered by the Portuguese in 1484. The discoverer was named Diego Cam, an expert and bold sailor. He was very well received by the natives, and sent some of his men with presents to the king ; but they being detained by unexpected accidents beyond the promised time of their return, Com was obliged to sail away without them, and took with him four young Congoeze, as hostages for the safety of his countrymen. These he taught the Portuguese language, in which they made

such progress that king John was highly pleased, and sent them back next year to Congo with rich presents ; charging them to exhort their monarch, in his name, to become a convert to the Christian religion, and to permit it to be propagated through his dominions. A firm alliance was concluded between the two monarchs, which continues to this day, though not without some interruptions, to which the Portuguese themselves have given occasion more than the natives.

Any particular account we have of this kingdom, rests almost entirely on the credit of Anthony Cavazzi, the traveller above-mentioned. He was a capuchin-friar, a native of the duchy of Modena, and was sent missionary into those parts *de propaganda fide*, in the year 1654, and arrived at Congo the same year. During his stay there, his zeal to make converts made him travel through all these different kingdoms ; and the credit he gained, as well as the great employments he was intrusted with, gave him an opportunity of informing himself of every thing relating to them with great exactness. The extent and situation, however, he could not possibly ascertain, for want of instruments ; nor hath this defect been since supplied. According to him, the dominions of Congo extended a great deal further eastward and southward before the introduction of Christianity than afterwards ; a great number of the states that were under the Congoeze monarchs, either as subjects, or tributary, having withdrawn their allegiance out of dislike to them on that account. Not content with opposing the officers and troops that came annually to raise the tribute imposed by the king, they made such frequent and powerful incursions into his dominions, that they obliged him to draw his forces nearer the centre of Congo to prevent an invasion ; by which means, the kingdom, from an extent of 600 leagues, was reduced to less than one half.

Congo Proper being situated within the torrid zone, is liable to excessive heats ; as it lies on the southern side of the equinoctial, the seasons are of course opposite to ours. They reckon only two principal seasons, the summer and winter ; the former begins in October, and continues till February or March ; during which time the sun's rays dart with such force, that the atmosphere appears to an European to be in a flame. The excessive heat, however, is mitigated by the equal length of the days and nights, as well as by the winds, breezes, rains and dews. The winter takes up the other part of the year ; and is said by the natives to be proportionally cold, though to an European it would appear hot. These two seasons they divide into six lesser ones, *viz.* Massanza, Neasû, Ecuudi, Quitombo, Quibiso, and Quibangela.

Massanza begins with the month of October, which is the beginning of their spring. The rains begin to fall at that time, and continue during the next two, and sometimes three, months. When they do so, the low lands are commonly overflowed by the extraordinary floods, and all their corn carried off. A disaster of this kind is commonly followed by a famine ; for the lazy inhabitants take no care to lay up any provisions, although such misfortunes happen very frequently. This first season they reckon commences at the time the plants begin to spring.

The

Congius
1
Congo.

* See
Panicle.

1
Extent.

2
History un-
certain and
fabulous.

3
The coun-
try discov-
ered by the
Portuguese.

Congo.

4
Cavazzi's
account of
Congo.

5
Extent less-
ened since
the intro-
duction of
Christianity

6
Account of
the climate
and seasons.

The second season, *Neafu*, begins about the end of January, when the produce of their lands has arrived at its full height, and wants but a few days of being ripened for harvest. This first crop is no sooner gathered in, than they sow their fields afresh, their land commonly yielding them two harvests.

The third and fourth seasons, called *Ecundi* and *Quitambo*, are frequently blended together towards the middle of March, when the more gentle rains begin to fall, and continue to do so till the month of May. These two seasons are distinguished by the greater or lesser quantity of rain that falls during that interval. During the rest of the time, the air is either very clear, hot, and dry; or the clouds being overcharged with electric matter, burst out into the most terrible thunders and lightnings, without yielding the least drop of rain, though they seem loaded with it.

The two last, *viz.* the *Quibio* and *Quibangala*, make up their short winter, which consists not in frost or snow, but in dry, blasting winds, which strip the earth of all its verdure, till the next *Maffanza* begins to restore them to their former bloom.

They now divide their year into twelve lunar months, and begin it in September. They have also weeks consisting of four days only, the last of which is their sabbath; and on it they religiously abstain from every kind of work. This practice, the compilers of the Universal History conjecture to have arisen from the extreme laziness for which this people, and indeed all the African nations, are so remarkable. To this shameful indolence also is to be ascribed the little produce they reap from their lands, while the Portuguese settled among them, who are at more pains in the cultivation of theirs, enjoy all manner of plenty. The natives, however, had rather run the risk of the most terrible famines, than be at the tenth part of the labour they see the Portuguese take. They seem to think it below them to use any other exercises than those of dancing, leaping, hunting, shooting, &c.; the rest of their time they spend in smoking, and downright idleness, committing the laborious part of their household affairs to their slaves, or, in want of them, to their wives. Nothing is more common than to see these poor creatures toiling in the fields and woods with a child tied to their backs, and fainting under their excessive labour and heavy burdens, or (which is still worse) lunker and thirst. What is yet more surprisingly shameful is, that though they have plenty of domestic animals which they might easily make use of for cultivating their grounds, and for other laborious services, and though they see the Portuguese do it every day to great advantage; yet they will rather see their tender females sink under their toil and labour, than be at the trouble of breeding up any of these useful creatures to their assistance.

The ground produces variety of grain, but no corn or rice except what is cultivated by the Portuguese. Their maize, or Indian wheat, grows very strong, and is well laden. This, being well ground, they make into bread, or boil with water into a kind of pap. Of this they have four kinds; one of which resembling what we call French wheat, is produced in plenty, and makes some amends for the want of industry in the people. They cultivate also a variety of the pease

and bean kind: but what they chiefly live upon, as most suitable to their lazy disposition, is a kind of nut, like our filberds, which fall to the ground of themselves, and are to be found every where; every nut that falls to the ground, producing a new shrub next year. They have scarcely any fruit-trees, but what have been brought thither by the Portuguese. They have various sorts of palm-trees, useful both by their fruit, leaves, and their juice, which is easily converted into wine; also by affording a kind of oil with which they dress their victuals, though the Europeans use it only to burn in their lamps. They have also a vast number of plants and shrubs, which it would be impossible to describe or enumerate. What is the only thing that the ground will not produce. It passes forth, indeed, the straw and the ear; the former of which grows high enough, we are told, to hide a man on horseback, but the latter is empty, without one grain fit for use. Father Labat, however, who had lived a considerable time in some of the American islands, where he had observed the same thing, tells us, that he had the curiosity to examine those ears more carefully, and had found some few grains; and that, having sowed them afresh, they produced very long ears, full of large heavy grain. Whence he conjectures, that if the Portuguese had tried the same experiment in their African settlements, it might perhaps have been attended with the same success.

In the low lands the grass grows so high, rank, and thick, that it becomes one of the most dangerous receptacles for wild beasts, serpents, and other venomous insects: on this account travelling is exceedingly hazardous, as they have few beaten roads in the whole country, and travellers are obliged to march over it through vast plains, in continual danger of being devoured or stung to death; to say nothing of the manifold diseases produced by the unwholesome dews with which the grass is covered during some part of the day. The only method of guarding against all these evils effectually, is by setting fire to the grass in the hot weather, when it is quite parched by the heat of the sun: but even this cannot be done without the greatest danger; because both the wild beasts and venomous reptiles, being roused out of their places of retirement, will fly furiously at those who happen to be in the way. In this case there is no possibility of escaping, but by climbing up the highest trees, or defending one's self by fire-arms or other weapons. In such emergencies, the natives have a much better chance than the Europeans; the former being able to climb trees with surprising swiftness; while the latter must be assisted with rope-ladders, which they commonly cause their blacks to carry about with them, and to go up and fasten to one of the branches.

The flowers are here exceedingly beautiful and numerous. Almost every field and grove yields a much nobler prospect than the European gardens can boast of, notwithstanding the pains bestowed on their cultivation. The flowers are remarkable, not only for the prodigious variety of their colours, but the vast quantity of heads which grow upon one stalk. In the day-time, indeed, they seem to have lost their natural fragrantcy; that being in some measure exhaled

7
Natives ex-
cessively in-
dolent.

8
Vegetables
produced in
Congo.

10
Great va-
riety of
flowers.

Congo.

by the heat of the sun : but this is amply compensated after its setting, and more especially a little before its rising, when their sweetness is again condensed, and revived by the coldness and dews of the night, after which they exhale their various refreshing scents in a much higher degree than ours. The lilies, which there grow naturally in the fields, valleys, and woods, excel those of our gardens, not only in their extreme whiteness, but much more in a delightful fragrant, without offending the head, as the European lilies do by their faintish sweetness. The tulips which there grow wild, though generally called *Perlie*, have something so surprisingly charming in the variety and combination of their colours, that they dazzle the eyes of an intense beholder : neither do their flowers grow singly as with us, but ten or twelve upon one stalk ; and with this double advantage, that they diffuse a very reviving and agreeable sweetness, and continue much longer in their full bloom. Of the same nature are their tuberose, hyacinths, and other native flowers ; which spring up in vast groups of 100 and 200 from one root, though somewhat smaller than ours ; some of them finely variegated, and all of them yielding an agreeable smell. The roses, jessamines, and other exotics brought thither from Europe or America, come up likewise in great perfection ; but require a constant supply of water, and diligent attendance to prevent them from degenerating. The American jessamine, in particular, instead of single flowers, will grow up by dozens in a bunch ; some of them of an exquisite white, and others of the colour of the most vivid fire.

11
Animals of
different
kinds.

A vast variety of animals of different kinds are found in the kingdom of Congo ; the chief of which are the elephant. This creature is mostly found in the province of Bamba, which abounds with woods, pasture, and plenty of water ; the elephants delighting much to bathe themselves during the heat of the day. They commonly go in troops of an hundred or more ; and some of them are of such a monstrous size, that we are told the print of their hoof hath measured four, nay seven, spans in diameter. From the hair of their tails, and that of some other animals, the natives, especially the women, weave themselves collars, bracelets, girdles, &c. with variety of devices and figures, which denote their quality ; and are in such esteem, that the hair of two elephants tails is sufficient to buy a slave. The reason of this is, that the natives have not the art of taming them, but are obliged to send some of their bravest and stoutest men to hunt them in the woods ; which is not done without great labour and danger, they being here exceedingly fierce. The most common way of hunting them is by digging deep holes in the ground, the top of which they cover with branches and leaves, as is practised in most parts of Asia.

Lions, leopards, tigers, wolves, and other beasts of prey, abound here in great plenty, and do much damage. Here are also a vast variety of monkeys of all sizes and shapes. The zebra, well known for its extreme beauty and swiftness, is also met with in this country. They have also a variety of buffaloes and wild asses ; but the *dante* seems to be an animal peculiar to this kingdom. It is shaped and coloured much like an

Congo.

ox, though not so large. Its skin is commonly bought by the Portuguese, and sent into Germany to be tanned and made into targets, which are then called *dantes*. The natives make use of their raw hide dried, to make their shields ; which are so tough that no arrow or dart can pierce them ; and they are also large enough to cover the whole body. The creature is vastly swift ; and when wounded, will follow the scent or smoke of the gunpowder with such fury, that the hunter is obliged to climb up a tree with all possible speed ; and this retreat he always takes care to secure before he ventures to fire. The wounded beast finding its enemy out of its reach, stays for him at the foot of the tree, and will not stir from it ; of which the hunter taking the advantage, dispatches it with repeated shots. The forests of Congo also swarm with wild dogs, who, like the wolves, prey upon the tame cattle, and are so fierce that they will attack armed men. Their teeth are exceeding keen and sharp ; they never bark, but make a dreadful howling when famished or in pursuit of their prey.

12
Birds.

This country also abounds with all the different kinds of birds that are to be found in other warm climates. One sort, which they call *birds of music*, is greatly esteemed, inasmuch that persons of the highest rank have from time immemorial taken the greatest delight in keeping them in cages and aviaries for the sake of their surprising melody. On the other hand, as the Congoese are superstitious to the last degree, there are several kinds of birds which they look upon as ominous, and are so terrified at the sight or hearing of them, that if they were going to enter upon ever so momentous an expedition, if they were met in council, or going to engage an enemy with ever so great an advantage, the flight or cry of such birds would throw them into a general panic, and disperse them in the utmost haste and confusion. The most dreadful of the ominous kind are the crows, ravens, bats, and owls. The great owl is the most terrible of all, and to him they give the name of *kariam pemba*, by which words they likewise denote the devil.

Fish of different kinds abound on the coasts of Congo in great numbers. But the inland parts are infested with such numbers of serpents, scorpions, and other venomous insects, as are perhaps sufficient to overbalance every natural advantage we have yet mentioned. The most pernicious and dangerous kind are the ants ; of which they reckon no less than six several species of different colours and sizes ; all of them formidable, on account of their prodigious numbers, and the mischief they do not only to the fruits of the earth, but to men and beasts ; whom they will surround in the night time, and devour even to the very bone. It is a common practice, we are told, to condemn persons guilty of some atrocious crimes, to be stripped naked, tied hand and foot, and thrown into a hole where these insects swarm ; where they are sure to be devoured by them in less than 24 hours to the very bones. But criminals are not the only persons who are in danger from the jaws of these little devouring insects. People may be attacked by them, as we have already hinted, in the night time, and while they are sleeping in their beds. This obliges the natives to be careful where they lie down, and to

13
Ants very
dangerous.

kindle

Congo.

kindle a small fire, or at least to have a circle of burning hot embers round their beds. This caution is still more necessary in the country villages and hamlets, where persons are otherwise in danger of being attacked by millions of them in the dead of the night. In such a case the only expedient to save one's self is to jump up as soon as one feels the bite, to brush them off with all possible speed, and then at once to set the house on fire. The danger is still greater in travelling through the country, where a person is often obliged to take up his lodging on the bare ground; and may be overtaken during the heat of the day with such profound sleep, as not to be awaked by these diminutive animals till they have made their way through the skin; and in such a case nothing will prevent their devouring a man alive, though there were ever so many hands to assist him: in such incredible quantities do these creatures abound, notwithstanding the great numbers of monkeys who are continually ferreting the ants out of their retreats, and feed upon them with the utmost avidity. This can only be ascribed to the natural laziness and indolence of the inhabitants; which is such, that they not only neglect to rid their lands of them by proper cultivation, but will suffer their houses, nay even their very churches, to be undermined by them. Another kind of these destructive vermin lie so thick upon the paths and highways, that a person cannot walk without treading upon, and having his legs and thighs almost devoured by them. A third sort of a white and red colour, but very small, will gnaw their way through the hardest wood, penetrate into a strong chest, and in a little while devour all the clothes, linen, and every thing that is in it. A fourth sort, small and black, leave a most intolerable stench upon every thing they touch or crawl over, whether clothes or household-stuff; which are not easily sweetened again: or if they pass over victuals, they are entirely spoiled. A fifth sort harbour chiefly on the leaves and branches of trees; and if a man chance to climb up thither to save himself from a wild beast, he is so tormented by them, that nothing but the fear of the jaws of the one could make him endure the stings of the other. A sixth sort is of the flying kind, and is probably one of the former kinds, that live wholly under ground, till nature furnishes them with wings. After this, they rise in such swarms as darken the air, and would make terrible havoc among all kinds of vegetables, did not the natives come out against them in whole companies, and by dint of flaps, and other flat weapons, knock them down by myriads, and then laying them in heaps, set fire to their wings, which half broils them for food. Amidst all this variety of pernicious insects, however, they have one species of a more friendly and profitable kind, viz. the industrious bee, which furnishes the inhabitants with honey and wax in such plenty, that there is scarce a hollow tree, cleft of a rock, or chop of the earth, in which their combs are not found in great quantities.

¹⁴ Congo with respect to the populousness of the kingdom of Congo, some authors writing either from mere conjecture, or at best precarious inferences, have represented it as thinly peopled. The accounts of the missionaries and Portuguese, however, are directly op-

posite to these. They found the country for the most part covered with towns and villages, and these swarming with inhabitants; the cities well filled with people, particularly the metropolis, which is said to contain above 50,000 souls. The provinces, though not equally populous, yet in the whole, make up such an amount, as plainly proves, that what is wanting in the one is amply made up by another. We are told that the duchy of Bamba is still able to raise 200,000 fighting men, and was formerly in a condition to raise double that number; and that the army of the king of Congo, in the year 1665, consisted of 900,000 fighting men, who were attended by an infinite number of women, children, and slaves. The numbers of the Congoese will appear the more credible, when we consider the extreme fecundity of their women, the hardiness with which they bring up their children, and the stoutness and healthiness of their men. In some villages, if the missionaries are to be credited, the number of children is so great, that a father will part with one or two, for any commodity he wants, or even for some trifling bawble he fancies; so that the number of slaves they sell abroad, seldom amounts, *communibus annis*, to less than 15 or 16,000.

There is scarce a nation on earth that have a higher opinion of themselves or their country, than the Congoese, or that is more hardened against all conviction to the contrary, from reason, experience, or the most impartial comparison with other countries in Europe or Asia. Indeed, it is impossible they should think otherwise, when it is one of the fundamentals of their belief, that the rest of the world was the work of angels, but that the kingdom of Congo, in its full and ancient extent, was the handy-work of the supreme Architect; and must of course have vast prerogatives and advantages over all others. When told of the magnificence of the European and Asiatic courts, their immense revenues, the grandeur of their palaces and edifices, the riches and happiness of their subjects, the great progress they have made in the arts and sciences to which their country is wholly a stranger, they coolly answer, that all this comes vastly short of the dignity and splendor of the kings and kingdom of Congo; and that there can be but one Congo in the world, to the happiness of whose monarch and people all the rest were created to contribute, and to whose treasury the sea and rivers pay their constant tribute of 'zim-bis, (or shells, which are their current coin); whilst other princes must condescend to enrich themselves by digging through rocks and mountains, to come at the excrements of the earth, for so they style gold and silver which are in such request among other nations. Accordingly, they imagine, that the nations which come to traffic with them, are forced to that servile employment by their poverty and the badness of their country, rather than induced to it by luxury or avarice; whilst they themselves can indulge their natural indolence or sloth, though attended with the most pinching poverty, rather than disgrace the dignity of their blood by the least effort of industry, which, how laudable and beneficial soever, is looked upon by them as only a lesser degree of slavery. But though they generally esteem it so much below their dignity to apply to any useful work, they think it no disgrace to beg or

Congo.

¹⁵ Congoese have a high opinion of themselves.

¹⁶ Their intolerable sloth, pride, &c.

Congo

Congo
1
Congregation.

steal. With respect to the first, they are said to be the most shameless and importunate beggars in the world. They will take no denial, spare no crouching, lying, prayers, to obtain what they want, nor curses and ill language when sent away without it. With regard to the last, they deem no theft unlawful or scandalous, except it be committed in a private manner, without the knowledge of the person wronged. It is esteemed a piece of bravery and gallantry to wrench any thing from another by violence; and this kind of theft is so common, not only among the vulgar, but also among the great ones, that they make no scruple, in their travels from place to place, to seize not only upon all the provisions they meet with in towns and villages, but upon every thing else that falls in their way. These violences oblige the poor people to conceal the few valuables they have, in some secret place out of the knowledge and reach of those harpies; and they think themselves well off, if they can escape a severe bastonading, or other cruel usage frequently inflicted upon them in order to make them discover the place of their concealment.

27
Complexion, character, customs, &c.

The complexion of the natives, both men and women, is black, though not in the same degree; some being of a much deeper black than others. Their hair is black and finely curled; some have it also of a dark sandy colour: their eyes are mostly of a fine lively black; but some are of a dark sea-colour. They have neither flat noses nor thick lips like the Nubians and other negroes. Their stature is mostly of the middle size; and, excepting their black complexion, they much resemble the Portuguese. In their temper they are mistrustful, envious, jealous, and treacherous; and where they once take a distaste or affront, will spare no pains, nor stick at any means however base, to be avenged of, and crush their enemy under their feet. There is no such thing among them as natural affection. A husband, if an heathen, may take as many wives as he pleases; and if a Christian, may have any number of concubines, whom he may divorce at pleasure, or even sell them though with child. So little regard have they for their children, that there is scarce one among them who will not sell a son or a daughter, or perhaps both, for a piece of cloth, a collar or girdle of coral or beads, and often for a bottle of wine or brandy.

18
Religion.

The religion of the Congoes in many parts is downright idolatry, accompanied with the most ridiculous superstitions, and the most absurd and detestable rites invented by their gangas or priests; and even in those parts where Christianity is professed, it is so darkened by superstitions of one kind or other, that we may justly question whether the people are any gainers by the exchange.

19
Government.

The government of this kingdom is monarchical, and as despotic as any in Asia or Africa. The kings are the sole proprietors of all the lands within their dominions; and these they can dispose of to whom they please, upon condition they pay a certain tribute out of them; upon failure of the payment of which, or any other neglect, they turn them out. Even the princes of the blood are subjected to the same law; so that there is no person of any rank or quality whatever, that can bequeath a foot of land to his heirs or

successors; and when these owners under the crown die, the lands immediately return to it again, whether they were in their possession, or had been let to ever so many tenants under them; so that it entirely depends on the prince whether these lands shall be continued in the same, or be disposed into other hands. The Portuguese, however, since their settling in these parts, have prevailed upon the monarchs to permit the heirs and successors to continue in the quiet possession of such lands, in order to avoid the confusions, or even rebellions, which the alienation and deprival of them frequently occasioned, and to oblige the tenants of them to pay their tribute more exactly and readily than they did before.

In Congo there are only three offences deemed capital, viz. treason, murder, and sorcery. In the former the offender's punishment chiefly depends on the prince's will, who commonly condemns him to the loss of his head and estate, the latter being confiscated for the king's use. A murderer is immediately beheaded, unless some atrocious circumstances seem to require, or the relations of the deceased petition for, a more severe death; in which last case, he is usually delivered up to them, to suffer such punishment as they think proper to inflict on him, and which is generally put in execution immediately after sentence is pronounced. Magic or sorcery, a crime very common in the unconverted provinces, is, on that account, more severely punished by the Christians; and the person convicted of it is immediately burned alive; which punishment seems to have been introduced by the Portuguese. Other punishments for lesser crimes are the bastinado, whipping, fines, and imprisonment. The Portuguese are allowed a judge of their own nation, not only for their law-suits among themselves, but between them and the natives, who decides all controversies according to the laws of Portugal; a privilege granted to no other Europeans.

20
Commerce.

St Salvador is the chief place of traffic the Portuguese and other Europeans have in this country. There are thought to be about 4000 of them settled here, who trade with most parts of the kingdom. The chief commodities they bring thither are either the product of Brazil, or European manufactures. The former consist chiefly of grains, fruits, plants, &c.; the latter of Turkey carpets, English cloth, and other stuffs; copper, brass vessels, some kinds of blue earthen ware, rings, and ornaments of gold, silver, and other base metals; coral, glass-beads, bugles, and other trinkets; light stuffs made of cotton, woolen, and linen, for cloathing; and a great variety of tools and other utensils. In return for these, they carry off a great number of slaves, amounting to 15 or 16,000 annually, as we have already observed. Formerly they used also to carry away elephants teeth, furs, and other commodities of the country; but these branches of commerce are now greatly decayed; and the slave-trade is what the Portuguese merchants principally depend on.

CONGREGATION, an assembly of several ecclesiastics united, so as to constitute one body; as an assembly of cardinals, in the constitution of the pope's court, met for the dispatch of some particular business.

These

congrega-
tionalists
Congreve.

These assemblies, being 16 in number, are distributed into several chambers, after the manner of our offices and courts: the first whereof is the pope's congregation, whose business it is to prepare the most difficult beneficiary matters to be afterward debated in the consistory: the second is the congregation of the holy office, or the inquisition: the third is the congregation *de propaganda fide*: the fourth is the congregation for explaining the council of Trent: the fifth is the congregation of the index, deputed to examine into pernicious and heretical books: the sixth is the congregation of immunities, established to obviate the difficulties that arise in the judgments of such suits as are carried on against churchmen: the seventh is the congregation of bishops and regulars: the eighth is the congregation for the examination of bishops, &c. It is also used for a company or society of religious, cantoned out of any order, so as to make a subdivision of the order itself: as the congregation of Cluny, &c. among the Benedictines. It is likewise used for assemblies of pious persons, in manner of fraternities.

CONGREGATIONALISTS, in church-history, a sect of Protestants who reject all church-government, except that of a single congregation under the direction of one pastor.

CONGRESS, in political affairs, an assembly of commissioners, envoys, deputies, &c. from several courts meeting to concert matters for their common good.

CONGRESS, in a judicial sense, the trial made by appointment of a judge, before sergeants and matrons, in order to prove whether or no a man be impotent, before sentence is passed for the dissolution of a marriage solicited upon such a complaint.

Neither the civil nor canon law makes any mention of the trial of virility by congress: it had its origin in France, from the boldness of a young fellow, who, in open court, having been hard pressed by his wife, demanded the *congruiss*. The judge, surprised with the novelty of the demand, found it could not be denied, as being the surest evidence that case could admit of. In time it became a branch in the French jurisprudence, and was authorized by decreets and arrests. It obtained for about 120 years; and was annulled by an arrest of parliament in 1677, as being found precarious; some having failed under the experiment out of mere modesty and shame, which is found to have the same effect with actual impotency.

CONGREVE (William), a younger brother of an ancient family in Staffordshire. His father was employed in the stewardship of the great estate of the earl of Burlington in Ireland, where he resided many years; and our author was born there in 1672. Mr Congreve entered into the Middle-Temple when he came to England, and began to study the law; but his bias was toward polite literature and poetry. His first performance was a novel, intitled, *Incognita*, or, *Love and Duty reconcil'd*. He soon after began his comedy of the *Old Bachelor*; which was the amusement of some leisure hours during a slow recovery from a fit of illness soon after his return to England; and was in itself so perfect, that Mr Dryden, on its being shewn to him, declared he had never in his life seen such a first play. When brought on the stage in 1693, it met with such universal approbation, that Mr

Congreve, though he was but 19 years old at the time of his writing it, became now considered as a prop to the declining stage, and a rising genius in dramatic poetry. The next year he produced the *Double Dealer*; which, for what reason is not obvious, did not meet with so much success as the former. The merit of his first play, however, had obtained him the favour and patronage of lord Halifax, and some peculiar marks of distinction from queen Mary; on whose death, which happened in the close of this year, he wrote a very elegant elegiac pastoral. In 1695, when Betterton opened the new house in Lincoln's-inn Fields, Mr Congreve joining with him, gave him his comedy of *Love for Love*, with which the company opened their campaign; and which met with such success, that they immediately offered the author a share in the management of the house, on condition of his furnishing them with one play yearly. This offer he accepted; but whether through indolence, or that correctness which he looked upon as necessary to his works, his *Mourning Bride* did not come out till 1697, nor his *Way of the World* till two years after that. The indifferent success this last mentioned play, though an exceeding good one, met with from the public, completed that disgust to the theatre, which a long contest with Jeremy Collier, who had attacked the immoralities of the English stage, and more especially some of his pieces, had begun, and he determined never more to write for the stage. However, though he quitted dramatic writing, he did not lay down the pen entirely; but occasionally wrote many little pieces both in prose and verse, all of which stand on the records of literary fame. It is very possible, however, that he might not so soon have given way to this disgust, had not the easiness of his circumstances rendered any subservience to the opinions and caprice of the town absolutely unnecessary to him. For his abilities having very early in life raised him to the acquaintance of the earl of Halifax, who was then the Mæcenas of the age, that nobleman, desirous of raising so promising a genius above the necessity of too hasty productions, made him one of the commissioners for licensing hackney-coaches, or, according to Coxeter, a commission of the wine-licence. He soon after bestowed on him a place in the pipe-office; and not long after gave him a post in the customs worth 600 l. *per annum*. In the year 1718, he was appointed secretary of Jamaica; so that, with all together, his income towards the latter part of his life was upwards of 1200 l. a-year.

The greatest part of the last 20 years of his life was spent in ease and retirement; and he either did not, or affected not to give himself any trouble about reputation. Yet some part of that conduct might proceed from a degree of pride; to which purpose, T. Cibber, in his lives of the poets, vol. IV. p. 93, relates the following anecdote of him: "When the celebrated Voltaire was in England, he waited upon Mr Congreve, and passed some compliments upon the merit and reputation of his works. Congreve thanked him; but at the same time told that ingenious foreigner, that he did not chuse to be considered as an author, but only as a private gentleman, and in that light expected to be visited. Voltaire answered, that

Congreve.

Congruity. if he had never been any thing but a private gentleman, in all probability he had never been troubled with that visit. He observes, in his own account of the transaction, that he was not a little disgusted with so unseemable a piece of vanity."

Towards the close of his life he was much afflicted with the gout; and making a tour to Bath for the benefit of the waters, was unfortunately overturned in his chariot; by which, it is supposed, he got some inward bruise, as he ever after complained of a pain in his side; and, on his return to London, continued gradually declining in his health, till the 19th of January 1729, when he died, aged 57; and, on the 26th following, was buried in Westminster Abbey, the pall being supported by persons of the first distinction.

CONGRUITY, a suitableness or relation of agreement between things.

The terms *congruity* and *propriety* are not applicable to any single object: they imply a plurality, and obviously signify a particular relation between different objects. Thus we currently say, that a decent garb is suitable or proper for a judge; modest behaviour for a young woman; and a lofty style for an epic poem: and, on the other hand, that it is unsuitable or incongruous to see a little woman sunk in an overgrown farthingale, a coat richly embroidered covering coarse and dirty linen, a mean subject in an elevated style, an elevated subject in a mean style, a first minister darning his wife's stocking, or a reverend prelate in lawn sleeves dancing a hornpipe.

The perception we have of this relation, which seems peculiar to man, cannot proceed from any other cause, but from a *sense* of congruity or propriety: for, supposing us destitute of that sense, the terms would be to us unintelligible.

It is a matter of experience, that congruity or propriety, where-ever perceived, is agreeable; and that incongruity or impropriety, where-ever perceived, is disagreeable. The only difficulty is, to ascertain what are the particular objects that in conjunction suggest these relations; for there are many objects that do not: the sea, for example, viewed in conjunction with a picture, or a man viewed in conjunction with a mountain, suggest not either congruity or incongruity. It seems natural to infer, what will be found true by induction, that we never perceive congruity nor incongruity but among things that are connected together by some relation; such as a man and his actions, a principal and its accessories, a subject and its ornaments. We are indeed so framed by nature, as, among things so connected, to require a certain suitableness or correspondence, termed *congruity* or *propriety*; and to be displeased when we find the opposite relation of *incongruity* or *impropriety*.

If things connected be the subject of congruity, it is reasonable before-hand to expect, that a degree of congruity should be required proportioned to the degree of the connection. And upon examination we find this to hold in fact: where the relation is intimate, as between a cause and its effect, a whole and its parts, we require the strictest congruity; but where the relation is slight, or accidental, as among things jumbled together in the same place, we require little or no congruity: the strictest propriety is required in beha-

viour and manner of living; because a man is connected with these by the relation of cause and effect: the relation between an edifice and the ground it stands upon, is of the most intimate kind; and therefore the situation of a great house ought to be lofty; its relation to neighbouring hills, rivers, plains, being that of proximity only, demands but a small share of congruity: among members of the same club, the congruity ought to be considerable, as well as among things placed for show in the same niche: among passengers in a stage-coach, we require very little congruity; and less still at a public spectacle.

Congruity is so nearly allied to beauty, as commonly to be held a species of it; and yet they differ so essentially, as never to coincide: beauty, like colour, is placed upon a single subject; congruity upon a plurality: further, a thing beautiful in itself, may, with relation to other things, produce the strongest sense of incongruity.

Congruity and propriety are commonly reckoned synonymous terms; but they are distinguishable; and the precise meaning of each must be ascertained. Congruity is the genus, of which propriety is a species; for we call nothing *propriety*, but that congruity or suitableness which ought to subsist between sensible beings and their thoughts, words, and actions.

In order to give a full view of these secondary relations, we shall trace them through some of the most considerable primary relations. The relation of a part to the whole, being extremely intimate, demands the utmost degree of congruity; even the slightest deviation is disgusting.

Examples of congruity and incongruity are furnished in plenty by the relation between a subject and its ornaments. A literary performance intended merely for amusement, is susceptible of much ornament, as well as a music-room or a play-house; for in gaiety, the mind hath a peculiar relish for show and decoration. The most gorgeous apparel, however improper in tragedy, is not unsuitable to opera-actors: the truth is, an opera, in its present form, is a mighty fine thing; but as it deviates from nature in its capital circumstances, we look not for nature nor propriety in those which are accessory. On other hand, a serious and important subject admits not much ornament; nor a subject that of itself is extremely beautiful: and a subject that fills the mind with its loveliness and grandeur, appears best in a dress altogether plain.

To a person of a mean appearance, gorgeous apparel is unsuitable; which, besides the incongruity, has a bad effect; for by contrast it shows the meanness of appearance in the strongest light. Sweetness of look and manner, requires simplicity of dress, joined with the greatest elegance. A stately and majestic air requires sumptuous apparel, which ought not to be gaudy, nor crowded with little ornaments. A woman of consummate beauty can bear to be highly adorned, and yet shows best in a plain dress:

For loveliness

Needs not the foreign aid of ornament,
But is when unadorn'd, adorn'd the most.

Thompson's *Autumn*, 208.

Congruity regulates not only the quantity of ornament, but also the kind. The ornaments that embellish

incongruity. A dancing-room ought to be all of them gay. No picture is proper for a church, but what has religion for its subject. All the ornaments upon a shield ought to relate to war; and Virgil, with great judgment, confines the carvings upon the shield of Æneas to the military history of the Romans: but this beauty is overlooked by Homer; for the bulk of the sculpture upon the shield of Achilles, is of the arts of peace in general, and of joy and festivity in particular: the author of Telemachus betrays the same inattention, in describing the shield of that young hero.

In judging of propriety with regard to ornaments, we must attend, not only to the nature of the subject that is to be adorned, but also to the circumstances in which it is placed: the ornaments that are proper for a ball, will appear not altogether so decent at public worship; and the same person ought to dress differently for a marriage-feast and for a burial.

Nothing is more intimately related to a man, than his sentiments, words, and actions; and therefore we require here the strictest conformity. When we find what we thus require, we have a lively sense of propriety: when we find the contrary, our sense of impropriety is not less lively. Hence the universal distaste of affectation, which consists in making a shew of greater delicacy and refinement than is suited either to the character or circumstances of the person.

Congruity and propriety, where-ever perceived, appear agreeable; and every agreeable object produceth in the mind a pleasant emotion: incongruity and impropriety, on the other hand, are disagreeable; and of course produce painful emotions. These emotions, whether pleasant or painful, sometimes vanish without any consequence; but more frequently occasion other emotions, which we proceed to exemplify.

When any slight incongruity is perceived, in an accidental combination of persons or things, as of passengers in a stage-coach, or of individuals dining at an ordinary; the painful emotion of incongruity, after a momentary existence, vaniseth without producing any effect. But this is not the case of propriety and impropriety: voluntary acts, whether words or deeds, are imputed to the author; when proper, we reward him with our esteem; when improper, we punish him with our contempt. Let us suppose, for example, a generous action suited to the character of the author, which raises in him and in every spectator the pleasant emotion of propriety: this emotion generates in the author both self-esteem and joy; the former when he considers his relation to the action, and the latter when he considers the good opinion that others will entertain of him: the same emotion of propriety produceth in the spectators esteem for the author of the action; and when they think of themselves, it also produceth, by means of contrast, an emotion of humility. To discover the effects of an unsuitable action, we must invert each of these circumstances: the painful emotion of impropriety generates in the author of the action both humility and shame; the former when he considers his relation to the action, and the latter when he considers what others will think of him: the same emotion of impropriety produceth in the spectators contempt for the author of the action; and it also produceth, by means of contrast, when they think of

themselves, an emotion of self-esteem. Here then *Congruity.* are many different emotions, derived from the same action considered in different views by different persons; a machine provided with many springs, and not a little complicated. Propriety of action, it would seem, is a chief favourite of nature, when such care and sollicitude is bestowed upon it. It is not left to our own choice; but, like justice, is required at our hands; and, like justice, is enforced by natural rewards and punishments: a man cannot, with impunity, do any thing unbecoming or improper; he suffers the chastisement of contempt inflicted by others, and of shame inflicted by himself. An apparatus so complicated, and so singular, ought to rouse our attention: for nature doth nothing in vain; and we may conclude with great certainty, that this curious branch of the human constitution is intended for some valuable purpose.

A gross impropriety is punished with contempt and indignation, which are vented against the offender by corresponding external expressions; nor is even the slightest impropriety suffered to pass without some degree of contempt. But there are improprieties, of the lighter kind, that provoke laughter; of which we have examples without end, in the blunders and absurdities of our own species: such improprieties receive a different punishment, as will appear by what follows. The emotions of contempt and of laughter occasioned by an impropriety of this kind, uniting intimately in the mind of the spectator, are expressed externally by a peculiar sort of laugh, termed a *laugh of derision or scorn*. An impropriety that thus moves not only contempt but laughter, is distinguished by the epithet of *ridiculous*; and a laugh of derision or scorn is the punishment provided for it by nature. Nor ought it to escape observation, that we are so fond of inflicting this punishment, as sometimes to exert it even against creatures of an inferior species: witness a turkeycock swelling with pride, and strutting with displayed feathers; a ridiculous object, which in a gay mood is apt to provoke a laugh of derision.

We must not expect, that these different improprieties are separated by distinct boundaries: for of improprieties, from the slightest to the most gross, from the most risible to the most serious, there are degrees without end. Hence it is, that in viewing some unbecoming actions, too risible for anger, and too serious for derision, the spectator feels a sort of mixt emotion, partaking both of derision and of anger; which accounts for an expression, common with respect to the impropriety of some actions, that we know not whether to laugh or be angry.

It cannot fail to be observed, that in the case of a risible impropriety, which is always slight, the contempt we have for the offender is extremely faint, though derision, its gratification, is extremely pleasant. This disproportion between a passion and its gratification, seems not conformable to the analogy of nature. In looking about for a solution, we must reflect upon what is laid down above, that an improper action not only moves our contempt for the author, but also, by means of contrast, swells the good opinion we have of ourselves. This contributes, more than any other article, to the pleasure we have in ridiculing follies

Congruity. follies and absurdities; and accordingly, it is well known, that they who put the greatest value upon themselves are the most prone to laugh at others. Pride, which is a vivid passion, pleasant in itself, and not less so in its gratification, would singly be sufficient to account for the pleasure of ridicule, without borrowing any aid from contempt. Hence appears the reason of a noted observation, That we are the most disposed to ridicule the blunders and absurdities of others, when we are in high spirits; for in high spirits, self-conceit displays itself with more than ordinary vigour.

With regard to the final causes of congruity and impropriety; one, regarding congruity, is pretty obvious, that the sense of congruity, as one principle of the fine arts, contributes in a remarkable degree to our entertainment. Congruity, indeed, with respect to quantity, coincides with proportion: when the parts of a building are nicely adjusted to each other, it may be said indifferently, that it is agreeable by the congruity of its parts, or by the proportion of its parts. But propriety, which regards voluntary agents only, can never be the same with proportion: a very long nose is disproportioned, but cannot be termed *improper*. In some instances, it is true, impropriety coincides with disproportion in the same subject, but never in the same respect; for example, a very little man buckled to a long Toledo: considering the man and the sword with respect to size, we perceive a disproportion; considering the sword as the choice of the man, we perceive an impropriety.

The sense of impropriety with respect to mistakes, blunders, and absurdities, is happily contrived for the good of mankind. In the spectators, it is productive of mirth and laughter, excellent recreation in an interval from business. But this is a trifle in respect of what follows. It is painful to be the subject of ridicule; and to punish with ridicule the man who is guilty of an absurdity, tends to put him more upon his guard in time coming. Thus even the most innocent blunder is not committed with impunity; because, were errors licensed where they do no hurt, inattention would grow into a habit, and be the occasion of much hurt.

The final cause of propriety as to moral duties, is of all the most illustrious. To have a just notion of it, the moral duties that respect others must be distinguished from those that respect ourselves. Fidelity, gratitude, and the forbearing injury, are examples of the first sort; temperance, modesty, firmness of mind, are examples of the other: the former are made duties by the sense of justice; the latter by the sense of propriety. Here is a final cause of the sense of propriety, that must rouse our attention. It is undoubtedly the interest of every man, to suit his behaviour to the dignity of his nature, and to the station allotted him by Providence; for such rational conduct contributes in every respect to happiness, by preserving health, by procuring plenty, by gaining

the esteem of others, and, which of all is the greatest blessing, by gaining a justly-founded self-esteem. But in a matter so essential to our well-being, even self-interest is not relied on: the powerful authority of duty is superadded to the motive of interest. The God of nature, in all things essential to our happiness, hath observed one uniform method: to keep us steady in our conduct, he hath fortified us with natural laws and principles, which prevent many aberrations, that would daily happen were we totally surrendered to so fallible a guide as is human reason. Propriety cannot rightly be considered in another light, than as the natural law that regulates our conduct with respect to ourselves; as justice is the natural law that regulates our conduct with respect to others. We call propriety a law, not less than justice; because both are equally rules of conduct that ought to be obeyed: propriety includes this obligation: for to say an action is proper, is, in other words, to say, that it *ought* to be performed; and to say it is improper, is, in other words, to say that it ought to be forborne. It is this very character of *ought* and *should* that makes justice a law to us, and the same character is applicable to propriety, though perhaps more faintly than to justice: but the difference is in degree only, not in kind; and we ought, without hesitation or reluctance, to submit equally to the government of both.

But it must, in the next place, be observed, that to the sense of propriety, as well as of justice, are annexed the sanctions of rewards and punishments; which evidently prove the one to be a law as well as the other. The satisfaction a man hath in doing his duty, joined with the esteem and good will of others, is the reward that belongs to both equally. The punishments also, though not the same, are nearly allied; and differ in degree more than in quality. Disobedience to the law of justice, is punished with remorse; disobedience to the law of propriety, with shame, which is remorse in a lower degree. Every transgression of the law of justice raises indignation in the beholder; and so doth every flagrant transgression of the law of propriety. Slighter improprieties receive a milder punishment: they are always rebuked with some degree of contempt, and frequently with derision. In general, it is true, that the rewards and punishments annexed to the sense of propriety, are slighter in degree than those annexed to the sense of justice: which is wisely ordered, because duty to others is still more essential to society, than duty to ourselves; for society could not subsist a moment, were individuals not protected from the headstrong and turbulent passion of their neighbours.

CONI, a strong town of Italy, in Piedmont, and capital of a territory of that name, with a good citadel. This town being divided into two factions, it surrendered to the French in 1641; but was restored to the duke of Savoy soon after. It is seated at the confluence of the rivers Gresse and Sture. E. Long. 7. 29. N. Lat. 44. 23.

C O N I C S E C T I O N S

ARE curve lines formed by the intersections of a cone and plane.

If a cone be cut by a plane through the vertex, the section will be a triangle ABC, Plate LXXIV. fig. 1.

If

SECT. I.
Plate
XXXIV.

Plate
LXXXIV.

If a cone be cut by a plane parallel to its base, the section will be a circle. If it be cut by a plane DEF, fig. 1. in such a direction, that the side AC of a triangle passing through the vertex, and having its base BC perpendicular to EF, may be parallel to DP, the section is a parabola; if it be cut by a plane DR, fig. 2. meeting AC, the section is an ellipse; and if it be cut by a plane DMO, fig. 3. which would meet AC extended beyond A, it is an hyperbola.

If any line HG, fig. 1. be drawn in a parabola perpendicular to DP, the square of HG will be to the square of EP, as DG to DP; for let LHK be a section parallel to the base, and therefore a circle, the rectangle LGK, will be equal to the square of HG, and the rectangle BPC equal to the square of EP; therefore these squares will be to each other as their rectangles; that is, as BP to LG, that is DP to DG.

SECT. I. Description of Conic Sections on a Plane.

1. PARABOLA.

"LET AB, fig. 4. be any right line, and C any point without it, and DKF a ruler, which let be placed in same plane in which the right line and point are, in such a manner that one side of it, as DK, be applied to the right line AB, and the other side KF coincide with the point C; and at F, the extremity of the side KF, let be fixed one end of the thread FNC, whose length is equal to KF, and the other extremity of it at the point C, and let part of the thread, as FG, be brought close to the side KF by a small pin G; then let the square DKF be moved from B towards A, so that all the while its side DK be applied close to the line BA, and in the mean time the thread being extended will always be applied to the side KF, being stoppt from going from it by means of the small pin; and by the motion of the small pin N there will be described a certain curve, which is called a *semi-parabola*.

"And if the square be brought to its first given position, and in the same manner be moved along the line AB, from B towards H, the other semi-parabola will be described."

The line AB is called the *directrix*; C, the focus; any line perpendicular to AB, a *diameter*; the point where it meets the curve, its *vertex*; and four times the distance of the vertex from the directrix, its *latus rectum* or *parameter*.

2. ELLIPSE.

"If any two points, as A and B, fig. 5. be taken in any plane, and in them are fixed the extremities of a thread, whose length is greater than the distance between the points, and the thread extended by means of a small pin C, and if the pin be moved round from any point until it return to the place from whence it began to move, the thread being extended during the whole time of the revolution, the figure which the small pin by this revolution describes is called an *ellipse*."

The points AB are called the *foci*; D, the *centre*; EF, the *transverse axis*; GH, the *lesser axis*; and any other line passing through D, a *diameter*.

3. HYPERBOLA.

"If to the point A, fig. 6. in any plane, one end

"of the rule AB be placed, in such a manner, that about that point, as a centre, it may freely move; and if to the other end B, of the rule AB, be fixed the extremity of the thread BDC, whose length is smaller than the rule AB, and the other end of the thread being fixed in the point C, coinciding with the side of the rule AB, which is in the same plane with the given point A; and let part of the thread, as BD, be brought close to the side of the rule AB, by means of a small pin D; then let the rule be moved about the point A, from C towards T, the thread all the while being extended, and the remaining part coinciding with the side of the rule being stoppt from going from it by means of the small pin, and by the motion of the small pin D, a certain figure is described which is called the *semi-hyperbola*."

The other semi-hyperbola is described in the same way, and the opposite HKF, by fixing the ruler to C, and the thread to A, and describing it in the same manner. A and C are called *foci*; the point G, which bisects AC, the *centre*; KE, the *transverse axis*; a line drawn through the centre meeting the hyperbolas, a *transverse diameter*; a line drawn through the centre, perpendicular to the transverse axis, and cut off by the circle MN, whose centre is E, and radius equal to CG, is called the *second axis*.

If a line be drawn through the vertex E, equal and parallel to the second axis GP and GO be joined, they are called *asymptotes*. Any line drawn through the centre, not meeting the hyperbolas, and equal in length to the part of a tangent parallel to it, and intercepted betwixt the asymptotes, is called a *second diameter*.

An ordinate to any section is a line bisected by a diameter and the abscissa, the part of the diameter cut off by the ordinate.

Conjugate diameters in the ellipse and hyperbola are such as mutually bisect lines parallel to the other; and a third proportional to two conjugate diameters is called the *latus rectum* of that diameter, which is the first in the proportion.

In the parabola, the lines drawn from any point to the focus are equal to perpendiculars to the directrix; being both equal to the part of the thread separated from the ruler.

In the ellipse, the two lines drawn from any point in the curve to the foci are equal to each other, being equal to the length of the thread; they are also equal to the transverse axis. In the hyperbola the difference of the lines drawn from any point to the foci is equal, being equal to the difference of the lengths of the ruler and thread, and is equal to the transverse axis.

From these fundamental properties all the others are derived.

The ellipse returns into itself. The parabola and hyperbola may be extended without limit.

Every line perpendicular to the directrix of a parabola meets it in one point, and falls afterwards within it; and every line drawn from the focus meets it in one point, and falls afterwards without it. And every line that passes through a parabola, not perpendicular to the directrix, will meet it again, but only once.

Every line passing through the centre of an ellipse

is bisected by it; the transverse axis is the greatest of all these lines; the lesser axis the least; and these nearer the transverse axis greater than those more remote.

In the hyperbola, every line passing through the centre, is bisected by the opposite hyperbola, and the transverse axis is the least of all these lines; also the second axis is the least of all the second diameters. Every line drawn from the centre within the angle contained by the asymptotes, meets at once, and falls afterwards within it; and every line drawn through the centre without that angle never meets it; and a line which cuts one of the asymptotes, and cuts the other extended beyond the centre, will meet both the opposite hyperbolas in one point.

If a line GM , fig. 4. be drawn from a point in a parabola perpendicular to the axis, it will be an ordinate to the axis, and its square will be equal to the rectangle under the abscissa MI and latus rectum; for, because GMC is a right angle, GM^2 is equal to the difference of GC^2 and CM^2 ; but GC is equal to GE , which is equal to MB ; therefore GM^2 is equal to $BM^2 - CM^2$; which, because CI and IB are equal, is (8 *Enc. 2.*) equal to four times the rectangle under MI and IB , or equal to the rectangle under MI and the latus rectum.

Hence it follows, that if different ordinates be drawn to the axis, their squares being each equal to the rectangle under the abscissa and latus rectum, will be to each other in the proportion of the abscissas, which is the same property as was shewn before to take place in the parabola cut from the cone, and proves those curves to be the same.

This property is extended also to the ordinates of other diameters, whose squares are equal to the rectangle under the abscissas and parameters of their respective diameters.

In the ellipse, the square of the ordinate is to the rectangle under the segments of the diameter, as the square of the diameter parallel to the ordinate to the square of the diameter to which it is drawn, or as the first diameter to its latus rectum; that is, LK^2 fig. 5. is to EKF as EF^2 to GH^2 .

In the hyperbola, the square of the ordinate is to the rectangle contained under the segments of the diameters betwixt its vertices, as the square of the diameter parallel to the ordinate to the square of the diameter to which it is drawn, or as the first diameter to its latus rectum; that is, SX^2 is to EXK as MN^2 to KE^2 .

Or if an ordinate be drawn to a second diameter, its square will be to the sum of the squares of the second diameter, and of the line intercepted betwixt the ordinate and centre, in the same proportion; that is, RZ^2 fig. 6. is to ZG^2 added to GM^2 , as KE^2 to MN^2 . These are the most important properties of the conic sections: and, by means of these, it is demonstrated, that the figures are the same described on a plane as cut from the cone; which we have demonstrated in the case of the parabola.

SECT. II. Equations of the Conic Sections

ARE derived from the above properties. The equation of any curve, is an algebraic expression, which

denotes the relation betwixt the ordinate and abscissa; the abscissa being equal to x , and the ordinate equal to y .

If p be the parameter of a parabola, then $y^2 = px$; which is an equation for all parabolas.

If a be the diameter of an ellipse, p its parameter; then $y^2 : ax - xx :: p : a$; and $y^2 = \frac{p}{a} \times ax - xx$; an equation for all ellipses.

If a be a transverse diameter of a hyperbola, p its parameter; then $y^2 : ax + xx :: p : a$, and $y^2 = \frac{p}{a} \times ax + xx$.

If a be a second diameter of an hyperbola, then $y^2 = \frac{p}{a} \times aa + xx :: p : a$; and $y^2 = \frac{p}{a} \times aa + xx$; which are equations for all hyperbolas.

As all these equations are expressed by the second powers of x and y , all conic sections are curves of the second order; and conversely, the locus of every quadratic equation is a conic section, and is a parabola, ellipse, or hyperbola, according as the form of the equation corresponds with the above ones, or with some other deduced from lines drawn in a different manner with respect to the section.

SECT. III. General Properties of Conic Sections.

A tangent to a parabola bisects the angle contained by the lines drawn to the focus and directrix; in an ellipse and hyperbola, it bisects the angle contained by the lines drawn to the foci.

In all the sections, lines parallel to the tangent are ordinates to the diameter passing through the point of contact; and in the ellipse and hyperbola, the diameters parallel to the tangent, and those passing through the points of contact, are mutually conjugate to each other. If an ordinate be drawn from a point to a diameter, and a tangent from the same point which meets the diameter produced; in the parabola, the part of the diameter betwixt the ordinate and tangent will be bisected in the vertex; and in the ellipse and hyperbola, the semi-diameter will be a mean proportion betwixt the segments of the diameter betwixt the centre and ordinate, and betwixt the centre and tangent.

The parallelogram formed by tangents drawn through the vertices of any conjugate diameters, in the same ellipse or hyperbola, will be equal to each other.

SECT. IV. Properties peculiar to the Hyperbola.

As the hyperbola has some curious properties arising from its asymptotes, which appear at first view almost incredible, we shall briefly demonstrate them.

1. The hyperbola and its asymptotes never meet; if not, let them meet in S , fig. 6.; then by the property of the curve the rectangle KXE is to SX^2 as GE^2 to GM^2 or EP^2 ; that is, as GK^2 to SX^2 ; wherefore, KXE will be equal to the square of GK ; but the rectangle KXE , together with the square of GE , is also equal to the square of GK ; which is absurd.

2. If a line be drawn through a hyperbola parallel to its second axis, the rectangle, by the segments of that

Plate
LXXXIV.Plate
LXXXIV.

that line, betwixt the point in the hyperbola and the asymptotes, will be equal to the square of the second axis.

For if SZ , fig. 6. be drawn perpendicular to the second axis, by the property of the curve, the square of MG , that is, the square of PE , is to the square of GE , as the squares of ZG and the square of MG together, to the square of SZ or GX : and the squares of RX and GX are in the same proportion, because the triangles RXG , PEG are equiangular; therefore the squares ZG and MG are equal to the square of RX ; from which, taking the equal squares of SX and ZG , there remains the rectangle RSV , equal to the square of MG .

3. Hence, if right lines be drawn parallel to the second axis, cutting an hyperbola and its asymptotes, the rectangles contained betwixt the hyperbola and points where the lines cut the asymptotes will be equal to each other; for they are severally equal to the square of the second axis.

4. If from any points, d and S , in a hyperbola, there be drawn lines parallel to the asymptotes da SQ and Sb dc , the rectangle under da and dc will be equal to the rectangle under QS and Sb ; also the parallelograms da , Gc , and SQ gb , which are equiangular, and consequently proportional to the rectangles, are equal.

For draw YW RV parallel to the second axis, the rectangle Yd W is equal to the rectangle RSV ; wherefore, WD is to SV as RS is to dY . But because the triangles RQS , AYD , and GSV cd W , are equiangular, Wd is to SV as cd to Sb , and RS is to dY as SQ to da ; wherefore, dc is to Sb as SQ to da ; and the rectangle dc , da , is equal to the rectangle QS , Sb .

5. The asymptotes always approach nearer the hyperbola.

For, because the rectangle under SQ and Sb or QG , is equal to the rectangle under da and dc , or AG , and QG is greater than aG ; therefore ad is greater than QS .

6. The asymptotes come nearer the hyperbola than any assignable distance.

Let X be any small line. Take any point, as d , in the hyperbola, and draw da , dc , parallel to the asymptotes; and as X is to da , so let aG be to GQ . Draw QS parallel to aG , meeting the hyperbola in S , then QS will be equal to X . For the rectangle SQ gb will be equal to the rectangle da G ; and consequently SQ is to da as AG to GQ .

If any point be taken in the asymptote below Q , it can easily be shown that its distance is less than the line X .

SECT. V. Areas contained by Conic Sections.

THE area of a parabola is equal to $\frac{2}{3}$ the area of a circumscribed parallelogram.

The area of an ellipse is equal to the area of a circle

whose diameter is a mean proportional betwixt its latus rectum and the square of its axis.

If two lines, a d and QS , be drawn parallel to one of the asymptotes of an hyperbola, the space a QS d , bounded by these parallel lines, the asymptotes and the hyperbola will be equal to the logarithm of a Q , whose module is a d , supposing a G equal to unity.

SECT. VI. Curvature of Conic Sections.

THE curvature of any conic section, at the vertices of its axis, is equal to the curvature of a circle whose diameter is equal to the parameter of its axis.

If a tangent be drawn from any other point of a conic section, the curvature of the section in that point will be equal to the curvature of a circle to which the same line is a tangent, and which cuts off from the diameter of the section, drawn through the point, a part equal to its parameter.

SECT. VII. Uses of Conic Sections.

ANY body, projected from the surface of the earth, describes a parabola, to which the direction wherein it is projected is a tangent; and the distance of the directrix is equal to the height from which a body must fall to acquire the velocity wherewith it is projected: hence the properties of the parabola are the foundation of gunnery.

All bodies acted on by a central force, which decreases as the square of the distances increases, and impressed with any projectile motion, making any angle with the direction of the central force, must describe conic sections, having the central force in one of the foci, and will describe parabolas, ellipses, and hyperbolas, according to the proportion betwixt the central and projectile force. This is proved by direct demonstration.

The great principle of gravitation acts in this manner; and all the heavenly bodies describe conic sections having the sun in one of the foci; the orbits of the planets are ellipses, whose transverse and lesser diameters are nearly equal; it is uncertain whether the comets describe ellipses with very unequal axes, and so return after a great number of years; or whether they describe parabolas and hyperbolas, in which case they will never return.

SECT. VIII. Uses of Conic Sections in the Solution of Geometrical Problems.

MANY problems can be solved by conic sections that cannot be solved by right lines and circles. The following theorems, which follow from the simpler properties of the sections, will give a specimen of this.

A point equally distant from a given point and a given line, is situated in a given parabola.

A point, the sum of whose distances from two given points is given, is situated in a given ellipse.

A point, the difference of whose distances from two given points is given, is situated in a given hyperbola.

CON

CONICHTHYODONTES, or PLECTRONITE, in natural history, one of the three names the fossil teeth of fishes are known by.

CON

CONIFERÆ, in botany, an order of plants in the *fragmenta methodi generalis* of Linnaeus, containing the following genera, viz. cupressus, ephedra, equisetum, juniperus,

Coniferous juniperus, pinus, taxus, thuja.

Conium.

CONIFEROUS TREES, such as bear hard dry seed-vessels of a conical figure; consisting of several woody parts, being mostly fleshy, adhering closely together, and separating when ripe.

CONINGSECK, a town of Suabia in Germany, and capital of a county of the same name. E. Long. 9. 23. N. Lat. 47. 50.

CONJOINT, in a general sense, signifies, united or connected.

CONJOINT *Degrees*, in music, two notes which follow each other immediately in the order of the scale, as *ut* and *re*.

CONJOINT *Tetrachords*, two tetrachords, or fourths, where the same chord is the highest of one, and the lowest of the other.

CONISSALÆ, in natural history, a class of fossils naturally and essentially compounded, not inflammable, nor soluble in water, found in detached masses, and formed of crystalline matter debased by earth.

Of this class there are two orders, and of each of these only one genus. Conissalæ of the first order are found in form of a naturally regular and uniform powder; all the genuine particles of which are nearly of one determinate shape, appearing regularly concreted, and not fragments of others once larger. Conissalæ of the second order are found in form of a rude, irregular, and shapeless powder, the particles of which are never of any determinate figure, but seem broken fragments of once larger masses.

To the former genus belong the different kinds of sand; and to the latter the *saburæ*, or grits.

CONJUGATE DIAMETER, or *Axis*, of an *Ellipsis*, the shortest of the two diameters, or that bisecting the axis.

CONJUGATE *Hyperbolas*. See CONIC SECTIONS, sect. i. 3.

CONJUGATION, in grammar, a regular distribution of the several inflexions of verbs in their different voices, moods, tenses, numbers and persons, so as to distinguish them from one another. See GRAMMAR, n° 25. and LANGUAGE, n° 19, &c.

CONIUM, HEMLOCK, a genus of the *digynia* order, belonging to the pentandria class of plants. The species are three; 1. *The maculatum*, or *greater hemlock*, grows naturally on the sides of banks and roads in many parts of Britain. It is a biennial plant which perishes after it has ripened its seeds. It hath a long taper root like a parsnip, but smaller. The stalk is smooth, spotted with purple, and rises from four to upwards of six feet high; branching out toward the top into several smaller stalks, garnished with decomposed leaves, whose lobes are cut at the top into three parts; these are of a lucid green, and have a disagreeable smell. The stalks are terminated by umbels of white flowers, each being composed of about 10 rays or small umbels, and have a great number of flowers, which spread open, each sitting upon a distinct footstalk; the seeds are small and channelled, and like those of aniseed. It flowers in June, and the seeds ripen in autumn. 2. *The tenuifolium*, with striated seeds, differs from the first in having taller stalks, which are not so much spotted. The leaves are much narrower, and of a paler green; and this difference

is constant. It is a biennial plant, and grows naturally in Germany. 3. *The africanum*, with prickly seeds, is a native of the Cape of Good Hope. The plant rarely grows above nine inches high; the lower leaves are divided like those of the small wild rue, and are of a greyish colour; those upon the stalk are narrower, but of the same colour; these are terminated by umbels of white flowers, each of the larger umbels being composed of three small ones; the involucre hath three narrow leaves situated under the umbel. This flowers in July, and ripens seed in autumn, soon after which the plants decay.

Medicinal Uses. The first species is sometimes used as a discutient; and for this purpose is an ingredient in some plasters. It has generally been accounted poisonous when taken internally; and certainly is so when taken in a large quantity. Dr Stork, however, found, that in small doses it may be taken with great safety; and that without disordering the constitution, or even producing any sensible operation, it sometimes proves a powerful resolvent in many obdurate disorders.

CONJUNCT, in a general sense, signifies conjoined, concurrent, or united.

CONJUNCT *Rights*, in Scots law. See LAW, Part III. n° clxxx. 15, &c.

CONJUNCT, or *Confident Persons*, in Scots law. Ibid. n° clxxxiii. 8.

CONJUNCTION, in astronomy, the meeting of two or more stars or planets in the same degree of the zodiac.

CONJUNCTION, in grammar, an indeclinable word or particle, which serves to join words and sentences together, and thereby shews their relation or dependence upon one another. See GRAMMAR, n° 70.

CONJUNCTIVA, in anatomy. See there n° 406. b.

CONJURATION, magic words, characters, or ceremonies, whereby evil spirits, tempests, &c. are supposed to be raised, or driven away. The Romish priests pretend to expel devils, by preparing holy water in a particular manner, and sprinkling it over the possessed, with a number of conjurations, and exorcisms. See EXORCISM.

Some authors make the difference between conjuration and witchcraft to consist in this; that the former effects its end by prayers, and invocation of God's name, &c. to compel the devil to do what is desired; so that the conjurer is supposed to be at war with the devil, and that evil spirit to act merely out of constraint: whereas the latter attains its end by an immediate application to the devil himself; and the devil's complaisance is supposed to be the consequence of some compact between them, so that the devil and the witch have a good understanding together. Both these, again, differ from enchantment and sorcery; in that these latter operate secretly, and slowly, by spells, charms, &c. without ever calling on the devil, or having any conference with him.

CONNAUGHT, one of the four provinces of Ireland, bounded on the east by that of Leinster, on the west by the ocean, on the north and north-west by part of the ocean and province of Ulster, and on the south and east by Munster. It is about 130 miles in length, and 84 in breadth. It has no rivers of any great

Conjunct
Connaught.

Fig. 1.

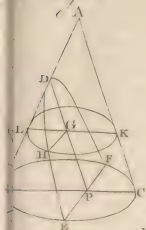


Fig. 2.

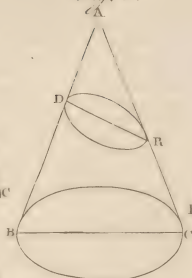


Fig. 3.

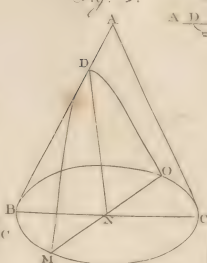


Fig. 4.

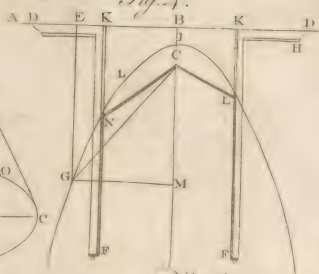


Fig. 5.

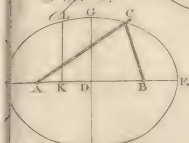


Fig. 6.

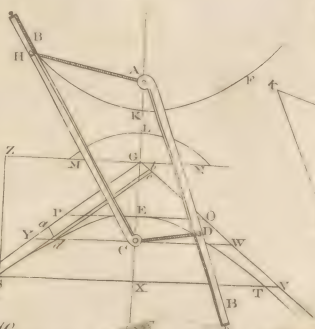


Fig. 7.
CIRCUMFERENTOR.



Fig. 8.



Fig. 8.
CHEVAL DE PRISE.



Fig. 10.

CROTALUS HORIDUS
or Rattle-snake.

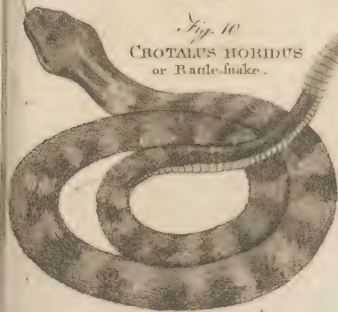


Fig. 11. COLUBER Punctatus.





Connarus
i
Connor.

great note, besides the Shannon. It has several convenient bays and creeks, and is fertile in many places. It had several dangerous bogs, over-run with woods, which are now in some measure cleared away. This province produces abundance of cattle, sheep, deer, hawks and honey; but the inhabitants being lazy, it is the least cultivated of all the four provinces. It contains one archbishopric, 5 bishoprics, 6 counties, 7 market-towns, 8 places of trade, 10 boroughs that send members to parliament, 47,256 houses, 24 old castles, besides fortresses that have been erected of late, and 330 parishes. The principal town is Galway.

CONNARUS, *CEYLON SUMACH*; a genus of the decandria order, belonging to the monodelphia class of plants. There is but one species, *viz.* the monocarpus. This is a native of India, and rises with a ligneous stalk eight or ten feet high, which is hard, rigid, and covered with a black bark, and divides upward into two or three branches garnished with trifoliate leaves, having long footstalks placed alternate. It is propagated by cuttings, and is to be treated in the same manner with other tender exotics.

CONNECTION, or CONNEXION, the relation or dependence of one thing upon another.

CONNECTION, or *Continuity*, in the drama, consists in the joining of the several scenes together.

The connection is said to be observed, when the scenes of an act succeed one another immediately, and are so joined as that the stage is never left empty.

CONNECTIVES, in grammar. See GRAMMAR, n° 69.

CONNIVENT VALVES, in anatomy, those wrinkles, cellules and valvules, which are found in the inside of the two intestines ileum and jejunum. See ANATOMY, n° 354, g, h.

CONNOISSEUR, a French word much used of late in English, to signify a person well skilled in any thing: whence it is used for a critic, or one who is a thorough judge upon any subject.

CONNOR (Bernard), a learned physician, was born in the county of Kerry, in Ireland, about the year 1666. Having determined to apply himself to the study of physic, he went to France, and resided some time in the university of Montpellier. Afterwards he went to Paris; where he obtained great skill in medicine, anatomy, and chemistry. From thence he travelled to Venice, with the two sons of the high-chancellor of Poland; and then taking a tour through great part of Germany, went to Warsaw, where he was made physician to king John Sobieski. In 1695, he came to England, read a course of lectures in London and Oxford, and became member of the Royal Society and College of Physicians; afterwards, being invited to Cambridge, he read public lectures there, and made various experiments in chemistry. He has rendered himself memorable for a philosophical and medical treatise in Latin, entitled, *Evangelium Medici*, i. e. "the Physician's Gospel;" tending to explain the miracles performed by Christ, as natural events, upon the principles of natural philosophy. He wrote also a history of Poland; and died in 1698, aged 32.

CONNOR, a city of Ireland, in the county of

Antrim and province of Ulster. W. Long. 6. 30. Conocarpus N. Lat. 54. 50.

CONOCARPUS, *BUTTON-WOOD*; a genus of the monogynia order, belonging to the pentandria class of plants. There are two species, the erecta and procumbens, both natives of the West Indies. They rise to the height of about 16 feet, but are trees of no beauty, nor is the wood of them used for any mechanic purpose in the countries where they grow naturally. They are, however, preserved in some botanic gardens in Britain, for the sake of variety.

CONOID, in geometry, a solid body, generated by the revolution of a conic section about its axis. See CONIC SECTIONS.

CONOIDES, in anatomy, a gland found in the third ventricle of the brain, called *pinealis*, from its resemblance to a pine-apple. See ANATOMY, n° 397, c.

CONON, the renowned Athenian general and admiral, flourished 394 years before Christ. See ATTICA, n° 162, 163. After his defeat by Lyfander, he fled to Evagoras king of Cyprus: after which he put himself under the protection of Artaxerxes king of Persia; with whose army he delivered Athens from the oppression of strangers, and rebuilt its walls. In the 360th year of Rome, he beat the Lacedaemonians in a sea-fight near Cnidus upon the coast of Asia, deprived them of the sovereign rule they had on sea ever since the taking of Athens, and had some other considerable advantages over them: but falling into the hands of Teribazus a Persian, who envied his glory, he was put to death.

CONQUEST, in a general sense; acquisition by victory; any thing gained.

Heir of CONQUEST, in Scots law. See LAW, Part III. n° clxxx. 6.

CONRAD II. elected emperor of Germany in 1004. He was obliged to take the field against most of the German dukes who had revolted from him; and he put Ernest duke of Suabia under the ban of the empire. This being one of the earliest instances of such a prohibition, the formula is inserted here for its singularity. "We declare thy wife a widow, thy children orphans; and we send thee, in the name of the devil, to the four corners of the world." It was in the reign of this prince that the the German fiefs became hereditary. He died in 1039.

CONRAD III. emperor of Germany in 1138. The duke of Bavaria opposed his election, and being put under the ban of the empire, and deprived of his duchy, he could not sur vive his disgrace. The margrave of Austria was ordered by the emperor to take possession of Bavaria; but Welfi, uncle to the deceased duke, attacked him, and was defeated near the castle of Winburgh: the battle fought upon this occasion is famous in history, as having given rise to the party-names of Guelphs and Gibbelines, afterwards assumed in Italy. The parole of the day with the Bavarians was *Welfi*, from the name of their general; that of the Imperialists *Werlingen*, from a small village where Frederic duke of Suabia, their commander, had been nursed: by degrees these names served to distinguish the two parties; and the Italians, who could not accustom themselves to such rough words, formed from them their Guelphs and Gibbelines. He died in 1152.

CONRAD

Conrad I Confanguinity. CONRAD of Lichtenau, or Abbas Uspergensis, was author of an universal Chronology from the creation to 1229, continued by an anonymous writer to Charles V. He collected a fine library, and died about the year 1240.

CONRADIN, or CONRAD junior, son of Conrad IV. was acknowledged emperor by the Gibbelines, who received him in triumph at Rome: but pope Alexander IV. had published a crusade against this orphan; and Urban VII. his successor, gave the empire to Charles of Anjou, brother to Louis IX. king of France; and the unfortunate youth, though powerfully supported, even by the Turks, lost a battle, in which he was taken prisoner, and was beheaded, by order of his base opponent, publicly, at Naples in 1229, in the 18th year of his age. In him ended the race of the dukes of Suabia, which had produced several kings and emperors.

CONFANGUINITY, or KINDRED, is defined by the writers on these subjects to be, *vinculum personarum ab eodem stipite descendunt*; "the connection or relation of persons descended from the same stock or common ancestor." This confanguinity is either lineal or collateral.

Lineal confanguinity is that which subsists between persons of whom one is descended in a direct line from the other; as between John Stiles (the *propositus* in the table of confanguinity) and his father, grandfather, great-grandfather, and so upwards in the direct ascending line; or between John Stiles and his son, grandson, great-grandson, and so downwards in the direct descending line. Every generation, in this direct lineal confanguinity, constitutes a different degree, reckoning either upwards or downwards: the father of John Stiles is related to him in the first degree, and so likewise is his son; his grandfire and grandson, in the second; his great-grandfire and great-grandson, in the third. This is the only natural way of reckoning the degrees in the direct line; and therefore universally obtains, as well in the civil and canon, as in the common law.

The doctrine of lineal confanguinity is sufficiently plain and obvious; but it is, at the first view, astonishing to consider the number of lineal ancestors which every man has, within no very great number of degrees: and so many different bloods is a man said to contain in his veins, as he hath lineal ancestors. Of these he hath two in the first ascending degree; his own parents: he hath four in the second; the parents of his father, and the parents of his mother: he hath eight in the third, the parents of his two grandfathers, and of his two grandmothers: and, by the same rule of progression, he hath 128 in the seventh; 1024 in the tenth; and at the 20th degree, or the distance of 20 generations, every man hath above a million of ancestors, as common arithmetic will demonstrate*. This lineal confanguinity, we may observe, falls strictly within the definition of "vinculum personarum ab eodem stipite descendunt"; since lineal relations are such as descend one from the other, and both of course from the same common ancestor.

Collateral kindred answers to the same description: collateral relations agreeing with the lineal in this, that they descend from the same stock or ancestor; but differing in this, that they do not descend the one from the other. Collateral kinsmen, then, are such as lineally spring from one and the same ancestor, who is the *stirps*, or "root," the *stipes*, "trunk," or common stock, from whence these relations are branched out. As if John Stiles hath two sons, who have each a numerous issue: both these issues are lineally descended from John Stiles as their common ancestor; and they are collateral kinsmen to each other, because they are all descended from this common ancestor, and all have a portion of his blood in their veins, which denominates them *confanguineous*.

We must be careful to remember, that the very being of collateral confanguinity consists in this descent from one and the same common ancestor. Thus Titius and his brother are related; why? because both are derived from one father: Titius and his first cousin are related; why? because both descend from the same

* This will seem surprising to those who are unacquainted with the increasing power of progressive numbers; but is palpably evident from the following table of a geometrical progression, in which the first term is 2, and the denominator also 2: or, to speak more intelligibly, it is evident, for that each of us has two ancestors in the first degree, the number of whom is doubled at every remove; because each of our ancestors has also two immediate ancestors of his own.

1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576

A shorter way of finding the number of ancestors at any even degree, is by squaring the number of ancestors at half that number of degrees. Thus, 16, the number of ancestors at 4 degrees, is the square of 4, the number of ancestors at two; 256 is the square of 16; 65,536 of 256; and the number of ancestors at 40 degrees would be the square of 1,048,576, or upwards of a million of millions.

confanguinity.

same grandfather; and his second cousin's claim to confanguinity is this; that they are both derived from one and the same great-grandfather. In short, as many ancestors as a man has, so many common stocks he has, from which collateral kinsmen may be derived. And as we are taught by holy writ, that there is one couple of common ancestors belonging to us all, from whom the whole race of mankind is descended, the obvious and undeniable consequence is, that all men are in some degree related to one another. For, indeed, if we only suppose each couple of our ancestors to have left, one with another, two children; and each of those children to have left, on an average, two more; (and, without such a supposition, the human species must be daily diminishing); we shall find that all of us have now subsisting near 270 millions of kindred in the 15th degree, at the same distance from the several common ancestors as we ourselves are; besides those that are one or two degrees nearer to or farther from the common stock, who may amount to as many more *. And if this calculation should appear incompatible with the number of inhabitants on the earth, it is because, by intermarriages among the several descendants from the same ancestor, a hundred, or a thousand modes of confanguinity may be consolidated in one person; or he may be related to us a hundred, or a thousand different ways.

The method of computing these degrees in the canon law, which we have adopted, is as follows. We begin at the common ancestor, and reckon downwards; and in whatsoever degree the two persons, or the most remote of them is distant from the common ancestor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the first degree; for from the father to each of

them is counted only one: Titius and his nephew are related in the second degree; for the nephew is two degrees removed from the common ancestor, viz. his own grandfather, the father of Titius: or (to give a more illustrious instance from the English annals) king Henry VII. who slew Richard III. in the battle of Bosworth, was related to that prince in the fifth degree. Let the *propositus* therefore, in the table of confanguinity, represent king Richard III. and the class marked *z*, king Henry VII. Now their common stock or ancestor was king Edward III. the *abavus* in the same table: from him to Edmund duke of York, the *proavus* is one degree; to Richard earl of Cambridge, the *avus*, two; to Richard duke of York, the *pater*, three; to king Richard III. the *propositus*, four; and from king Edward III. to John of Gant (*A*) is one degree; to John Earl of Somerset (*s*) two; to John, duke of Somerset (*c*) three; to Margaret countess of Richmond (*d*) four; to king Henry VII. (*e*) five. Which last mentioned prince, being the farthest removed from the common stock, gives the denomination to the degree of kindred in the canon and municipal law. Though according to the computation of the civilians (who count upwards from either of the persons related, to the common stock, and then downwards again to the other; reckoning a degree for each person both ascending and descending) these two princes were related in the ninth degree: for from king Richard III. to Richard duke of York, is one degree; to Richard earl of Cambridge, two; to Edmund duke of York, three; to king Edward III. the common ancestor, four; to John of Gant, five; to John earl of Somerset, six; to John duke of Somerset, seven; to Margaret countess of Richmond, eight; to king Henry VII. nine. See the Table of Confanguinity,

Confanguinity.

* This will swell more considerably than the former calculation: for here, though the first term is but 1, the denominator is 4; that is, there is one kinsman (a brother) in the first degree, who makes, together with the *propositus*, the two descendants from the first couple of ancestors; and in every other degree, the number of kindred must be the *quadruple* of those in the degree which immediately precedes it. For, since each couple of ancestors has two descendants which increase downwards, must be double to that in which the ancestors increase upwards; but we have seen that the ancestors increase in a duplicate ratio: therefore the descendants must increase in a double duplicate; that is, in a quadruple ratio.

Collateral Degrees. Number of Kindred.

1	1
2	4
3	16
4	64
5	256
6	1024
7	4096
8	16384
9	65536
10	262144
11	1048576
12	4194304
13	16777016
14	67108864
15	268435456
16	107371824
17	4294967296
18	17179869184
19	68719476736
20	27487796944

This calculation may also be formed by a more compendious process, viz. by squaring the couples, or half the number of ancestors at any given degree; which will furnish us with the number of kindred we have in the same degree, at equal distance with ourselves from the common stock, besides those at unequal distances. Thus, in the tenth lineal degree, the number of ancestors is 1024; its half, or the couples, amount to 512; the number of kindred in the tenth collateral degree amounts therefore to 262144, or the square of 512. And if we will be at the trouble to recollect the state of the several families within our own knowledge, and observe how far they agree with this account; that is, whether, on an average, every man has not one brother or sister, four first-cousins, sixteen second-cousins, and so on; we shall find that the present calculation is very far from being overcharged.

Conangu-
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Consent.

guinity, (Plate LXXXVIII. fig. 10.) wherein all the degrees of collateral kindred to the *propositus* are computed, as far as the tenth of the civilians, and the seventh of the canonists inclusive; the former being distinguished by the numeral letters, the latter by the common ciphers.

CONANGUINITY and *Affinity*, (degrees of) forbidden in marriage. See MARRIAGE; and LAW, Part III. N° clx. 4.

CONANGUINITY and *Affinity*, an objection against a judge. See LAW, Part III. N° clvi. 12. Against a witness, *ibid.* clxxxiv. 12.

CONSCIENCE, a secret testimony of the soul, whereby it gives its approbation to things that are naturally good, and condemns those that are evil. See MORAL *Philosophy*, N° 85, 86.

Courts of CONSCIENCE, are courts for recovery of small debts, constituted by act of parliament in London, Westminster, &c. and other populous and trading districts.

CONSCRIPT, in Roman antiquity, an appellant given to the senators of Rome, who were called *conscript fathers*, on account of their names being all entered in one register.

CONSECRATION, the act of devoting any thing to the service and worship of God. The Mosaic law ordained, that all the first-born, both of man and beast, should be sanctified or consecrated to God. We find also, that Joshua consecrated the Gibeonites, as Solomon and David did the Nethinims, to the service of the temple; and that the Hebrews sometimes consecrated their fields and cattle to the Lord, after which they were no longer in their power.

Among the ancient Christians, the consecration of churches was performed with a great deal of pious solemnity. In what manner it was done for the three first ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Constantine, churches were every where built, and dedicated with great solemnity. Some think the consecration consisted in setting up the sign of the cross, or in placing a communion-table in the church; and others, that no more was done than preaching a panegyric sermon in commemoration of the founder, and that then they proceeded to prayers, one of which was composed on purpose for the church to be consecrated. The Romanists have a great deal of pious foppery in the ceremonies of consecration; which they bestow on almost every thing, as bells, candles, books, water, oil, ashes, palms, swords, banners, pictures, crosses, agnus-dei's, roses, childrens clouts, &c.

In England, churches have been always consecrated with particular ceremonies, the form of which was left to the discretion of the bishop. That observed by bishop Laud, in consecrating St Catherine Creed church, in London, gave great offence.

CONSECRATION is particularly used for the benediction of the elements in the eucharist.

CONSENT, in a general sense, denotes much the same with ASSENT.

CONSENT of *Parts*, in the animal œconomy, an agreement or sympathy, whereby when one part is immediately affected, another at a distance becomes affected in the same manner. See SYMPATHY.

CONSEQUENCE, in logic, the conclusion, or what results from reason or argument. See CONCLUSION.

The consequence is that other proposition in which the extremes or premises of a syllogism are joined, or separated; and is gained from what was asserted in the premises.

This word, in a more restrained sense, is used for the relation or connection between two propositions, whereof one is inferred from the other.

CONSEQUENT, something deduced or gathered from a former argumentation. But, in a more precise sense, it is used for the proposition which contains the conclusion, considered in itself, without any regard to the antecedent: in which sense the consequent may be true, though the consequence be false. See the preceding article.

CONSERVATOR, an officer ordained for the security and preservation of the privileges of some cities and communities, having a commission to judge of and determine the differences among them.

CONSERVATORY, a term sometimes used for a green-house or ice-house.

CONSERVE, in pharmacy, a form of medicine contrived to preserve the flowers, herbs, roots, or fruits of several simples, as near as possible to what they are when fresh gathered. See PHARMACY, n° 454, &c.

CONSIGNMENT, in law, the depositing any sum of money, bills, papers, or commodities, in good hands; either by appointment of a court of justice, in order to be delivered to the persons to whom they are adjudged; or voluntarily, in order to their being remitted to the persons they belong to, or sent to the places they are designed for.

CONSIGNMENT of *Goods*, in commerce, is the delivering or making them over to another: thus, goods are said to be consigned to a factor, when they are sent to him to be sold, &c.; or when a factor sends back goods to his principal, they are said to be consigned to him.

CONSISTENCE, in physics, that state of a body wherein its component particles are so connected or entangled among themselves, as not to separate or recede from each other. It differs from continuity in this, that it implies a regard to motion or rest, which continuity does not, it being sufficient to denominate a thing continuous that its parts are contiguous to each other.

CONSISTENTES, in church-history, a kind of penitents who were allowed to assist at prayers, but who could not be admitted to receive the sacrament.

CONSISTORY (*Consistorium*), signifies as much as *prætorium*, a tribunal: it is commonly used for a council-house of ecclesiastical persons, or place of justice in the spiritual court; a session or assembly of prelates. And every archbishop and bishop of every diocese hath a consistory court held before his chancellor or commissary in his cathedral church, or other convenient place of his diocese, for ecclesiastical causes. The bishop's chancellor is the judge of this court, supposed to be skilled in the civil and canon law; and in places of the diocese far remote from the bishop's consistory, the bishop appoints a commissary to judge in all causes within

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Consistory.

within a certain district, and a register to enter his decrees, &c.

CONSISTORY, at Rome, is an ecclesiastical assembly held in the presence of the pope, for the reception of princes or their ambassadors, for the canonization of saints, for the promotion of cardinals, and other important affairs.

CONSOLE, in architecture, an ornament cut upon the key of an arch, which has a projecture, and, on occasion, serves to support little corniches, figures, bowls, and vases.

CONSOLIDATION, in law, the combining and uniting two benefices into one. The term is borrowed from the civil law; where it properly signifies an union of the possession, or occupation, with the property. Thus, if a man have by legacy *usum fructum fundi*, and afterwards buy the property, or fee-simple, of the heir; this is called a *consolidation*.

CONSOLIDATION, in medicine, the action of uniting broken bones, or the lips of wounds, by means of *consolidating remedies*, as they are called; which cleansing with a moderate heat and force, taking corruption out of the wounds, and preserving the temperature of the parts, cause the nourishment to be fitly applied to the part affected.

Among the many instances of the consolidating power of blood and raw flesh, we have a very remarkable one in Bartholine's Medical Observations. A man being condemned to have his nose cut off by the hand of the common executioner, the friends, who were to be present, provided a new loaf of warm bread, which was cut in the middle, and the nose received in it as it fell from the face: the nose was after this nicely placed on the face again; and, being sewed on, the whole in time consolidated, and left no other marks of the ignominy than the scar round the whole nose, and the traces of the stitches.

CONSONANCE, in music. See **INTERVAL**.

CONSONANT, a letter that cannot be sounded without some single or double vowel before or after it; as *b, c, d*, &c.

CONSPIRACY, in law, signifies an agreement between two or more, falsely to indict, or procure to be indicted, an innocent person, of felony.

CONSPIRATORS are, by statute, defined to be such as bind themselves by oath, covenant, or other alliance, to assist one another falsely and maliciously to indict persons, or falsely to maintain pleas.

Conspirators in treason, are those that plot against the king and the government.

CONSTABLE, according to some, is a Saxon word, compounded of *coning*, "king," and *staple*, which signifies the "stay or support of the king." But as we borrowed the name as well as the office of *constable* from the French, Sir William Blackstone is rather inclined to deduce it, with Sir Henry Spelman and Dr Cowel, from that language; wherein it is plainly derived from the Latin *comes stabuli*, an officer well known in the empire; so called, because, like the great constable of France, as well as the lord high constable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horseback. This great office of Lord High Constable hath been disused in

England, except only on great and solemn occasions, as the king's coronation, and the like, ever since the attainder of Stafford duke of Buckingham under king Henry VIII.; as in France it was suppressed about a century after by an edict of Lewis XIII.: but from his office, says Lambard, this lower constableness was at first drawn and fetched, and is, as it were, a very finger of that hand. For the statute of Winchester, which first appoints them, directs, that for the better keeping of the peace, two constables, in every hundred and franchise, shall inspect all matters relating to arms and armour.

Constables are of two sorts; high constables, and petty constables. The former were first ordained by the statute of Winchester as before mentioned; and are appointed at the court-leets of the franchise or hundred over which they preside; or, in default of that, by the justices at their quarter-sessions; and are removeable by the same authority that appoints them. The petty constables are inferior officers in every town and parish, subordinate to the high constable of the hundred, first instituted about the reign of Edward III. These petty constables have two offices united in them, the one ancient, and the other modern. Their ancient office is that of head-borough, tithing-man, or borholder; who are as ancient as the time of king Alfred: their more modern office is that of constable merely; which was appointed so lately as the reign of Edward III. in order to assist the high constable. And in general the ancient head-boroughs, tithing-men, and borholders, were made use of to serve as petty constables; though not so generally, but that in many places they still continue distinct officers from the constables. They are all chosen by the jury at the court-leet; or if no court-leet be held, are appointed by two justices of the peace.

The general duty of all constables, both high and petty, as well as of the other officers, is to keep the king's peace in their several districts; and to that purpose they are armed with very large powers of arresting, and imprisoning, of breaking open houses, and the like: of the extent of which powers, considering what manner of men are for the most part put upon these offices, it is perhaps very well that they are generally kept in ignorance. One of their principal duties arising from the statute of Winchester, which appoints them, is to keep watch and ward in their respective jurisdictions. Ward, guard, or *custodia*, is chiefly intended of the day-time, in order to apprehend rioters, and robbers on the highways; the manner of doing which is left to the discretion of the justices of the peace, and the constable: the hundred being, however, liable for all the robberies committed therein by day-light, for having kept negligent guard. Watch is properly applicable to the night only, (being called among the Saxons *wach* or *waſſen*); and it begins when ward ends, and ends when that begins: for, by the statute of Winchester, in walled towns the gates shall be closed from sun-setting to sun-rising; and watch shall be kept in every borough and town, especially in the summer season, to apprehend all rogues, vagabonds and night-walkers, and make them give an account of themselves. The constable may appoint watchmen at his discretion, regulated by the

Constables custom of the place; and these, being his deputies, have, for the time being, the authority of their principal.

There are also constables denominated from particular places, as constable of the Tower, of Dover castle, of Windsor castle, of the castle of Caernarvon, and many other of the castles of Wales; whose office is the same with that of the castellani, or governors of castles.

CONSTABLE of *Scotland*. See *LAW*, Part III. clviii. 15.

CONSTABLES to *Justices of the Peace*, in Scots law, are the proper officers for executing their orders. They have powers to suppress tumults, and to apprehend delinquents and those who can give no good account of themselves, and carry them to the next justice.

CONSTANCE, a strong town of Germany, in the circle of Suabia, with a bishop's see, whose bishop is a prince of the empire. It has a handsome bridge, and several fine structures, as well faced as profane. It carries on a great trade, and is well fortified; and though it pretends to be an imperial town, the Austrians keep a garrison here. It is famous for a council held here in 1514, when there were three popes; but they were all deposed, and Martin V. was elected in their room. The council caused Jerom of Prague to be burnt, though the emperor Sigismund had given him a safe conduct; in pursuance of this maxim, "that no faith is to be kept with heretics." They likewise condemned the doctrine of Wickliff, and ordered his bones to be burned 40 years after he was dead. However, the inhabitants now are Protestants. It is seated on a lake of the same name. E. Long. 9. 12. N. Lat. 47. 35.

CONSTANCE, a great lake of Germany, between Suabia and Switzerland. It is 30 miles in length, and 8 in breadth. It is crossed by the river Rhine; and there are several towns on its banks.

CONSTANTINA, a strong and considerable town of Africa, in the kingdom of Algiers, and capital of a territory of the same name. It is the largest and strongest place in all the eastern parts; and it is seated on the top of a great rock. There is no way to it but by steps cut out of the rock; and the usual way of punishing criminals here is to throw them down the cliff. Here are a great many Roman antiquities, particularly a triumphal arch. E. Long. 7. 12. N. Lat. 36. 4.

CONSTANTINA, a town of Spain, in Andalusia, and capital of a small territory of the same name, with a castle seated on a mountain. W. Long. 5. 35. N. Lat. 37. 40.

CONSTANTINE, a kingdom of Barbary of that name, in Africa. It is bounded on the north by the Mediterranean, on the east by the kingdom of Tunis, on the south by Bildulgerid, and on the west by the river Sufegmar, which separates it from the kingdom of Bugia. The country is the new Numidia of the ancients, and had its own king; but it is now a province to Algiers.

CONSTANTINE the Great, the first emperor of the Romans who embraced Christianity. His father, Constantinus Chlorus, rendered himself famous by his victorious expeditions to Germany and Britain: upon the

abdication of Diocletian, he shared the Roman empire with Galerius Maximinus in 305, and was at that time at York, where he died in 306; having first caused his son Constantine the Great to be proclaimed emperor by his army, and by the English. Galerius at first refused to admit Constantine to his father's share in the imperial throne; but after having lost several battles, he consented in 308. Maxentius, who succeeded Galerius, opposed him: but was defeated, and drowned himself in the Tyber. The senate then declared Constantine, *chief or first* augustus, and Licinius his second associate in the empire in 313. These princes published an edict, in their joint names, in favour of the Christians; but soon after Licinius, jealous of Constantine's renown, conceived an implacable hatred against him, and renewed the persecutions against the Christians. This brought on a rupture between the emperors; and a battle, in which Constantine was victorious. A short peace ensued: but Licinius having shamefully violated the treaty, the war was renewed; when Constantine totally defeating him, he fled to Nicomedia, where he was taken prisoner and strangled in 323. Constantine, now become sole master of the western and eastern empires, immediately formed the plan of establishing Christianity as the religion of the state; for which purpose, he convoked several ecclesiastical councils: but finding he was likely to meet with great opposition from the Pagan interest at Rome, he conceived the design of founding a new city, to be the capital of his Christian empire; see CONSTANTINOPLE. The glory Constantine had acquired by establishing the Christian religion, was tarnished by the part he took in the persecutions carried on by the Arians, towards the close of his reign, against their Christian brethren who differed from them: seduced by Eusebius of Nicomedia, he banished several eminent prelates; soon after which, he died in 337, the 66th year of his age, and 31st of his reign.

As to the character of Constantine, he was chaste, pious, laborious and indefatigable; a great general, successful in war, and deserving his success by his shining valour and by the brightness of his genius; a protector of arts, and an encourager of them by his beneficence. If we compare him with Augustus, we shall find that he ruined idolatry, by the same precautions and the same address that the other used to destroy liberty. Like Augustus, he laid the foundation of a new empire; but less skillful, and less polite, he could not give it the same stability: he weakened the body of the state by adding to it, in some measure, a second head in the foundation of Constantinople; and transporting the centre of motion and strength too near the eastern extremity, he left without heat, and almost without life, the western parts, which soon became a prey to the barbarians. The Pagans were too much his enemies to do him justice. Eutropius says, that in the former part of his reign he was equal to the most accomplished princes, and in the latter to the meanest. The younger Victor, who makes him to have reigned more than 31 years, pretends that in the first 10 years he was a hero; in the 12 succeeding ones a robber; and in the 10 last a spendthrift. It is easy to perceive, with respect to these two reproaches

Constantine of Victor's, that the one relates to the riches which Constantine took from idolatry, and the other to those with which he loaded the church.

CONSTANTINE emperor of the East in 1002, left the care of the empire to his wife Helena, who loaded the people with taxes, and fold all the offices in church and state to the highest bidders; while the emperor employed himself in reading, writing, and the fine arts, till he became as good an architect and painter, as he was a bad prince: he wrote several biographical and geographical works, which would have done honour to his name, if he had not neglected his duty to compile them. He died in 959.

CONSTANTINE (Dracofes), the son of Emmanuel Paleologus, was placed on the throne by sultan Amurath in 1448. But Mahomet II. his successor, resolving to dethrone him, laid siege to Constantinople by sea and land, and took it by assault in 1453, after it had held out 85 days. The unfortunate emperor seeing the Turks enter the breaches, threw himself into the midst of the enemy, and was cut to pieces; the children of the imperial house were massacred by the soldiers; and the women reserved to gratify the lust of the conqueror: and thus terminated the dynasty of the Constantines, 1123 years after its establishment at Constantinople.

CONSTANTINE (Robert), a learned physician born at Caen, taught polite literature in that city; and acquired great reputation by his skill in the Greek language, in history, and in medicine. He died in 1603, aged 103. He wrote a dictionary in Greek and Latin, and other works, which are esteemed.

Removing the imperial seat to this city the cause of the decline of the western empire.

CONSTANTINOPLE, the modern name of the city of BYZANTIUM in Thrace. It was enlarged and beautified by the Roman emperor Constantine the Great, in the year 330. At the same time he transferred thither the seat of the empire; and this removal is generally thought to have been one of the principal causes of the sudden decline of the western empire after this period.

In the year 332, the Sarmatians implored Constantine's assistance against the Goths, who had made an irruption into their territories, and destroyed every thing with fire and sword. The emperor readily granted their request, and gained a complete victory. Near 100,000 of the enemy perished, either in the battle, or after it with hunger and cold. In consequence of this overthrow, the Goths were obliged to sue for peace; but the ungrateful Sarmatians no sooner found themselves delivered from their enemies, than they turned their arms against their benefactor, and ravaged the provinces of Media and Thrace. The emperor, receiving intelligence of this treachery, returned with incredible expedition, cut great numbers of them in pieces, and obliged the rest to submit to what terms he was pleased to impose.

Is highly
respected.

Constantine seems to have been a prince very highly respected, even by far distant nations. In 333, according to Eusebius, ambassadors arrived at Constantinople from the Blemys, Indians, Ethiopians, and Persians, courting his friendship. They were received in a most obliging manner; and learning from the ambassadors of Sapor king of Persia, that there were great numbers of Christians in their master's dominions,

Constantine wrote a letter in their behalf to the Persian monarch.

Next year, the Sarmatians being again attacked by the Goths, found themselves obliged to set at liberty and arm their slaves against them. By this means they indeed overcame the Goths; but the victorious slaves turning their arms against their masters, drove them out of the country. This misfortune obliged them to the number of 300,000 to apply for relief to the Roman emperor, who incorporated with his legions such as were capable of service; and gave settlements to the rest in Thrace, Scythia, Macedon, and Italy. This was the last remarkable action of Constantine the Great. He died on May 25th 337, having divided the empire among his children and nephews, in the following manner. Constantine, his eldest son, had Gaul, Spain, and Britain; Constantius, the second, had Asia, Syria, and Egypt; and Constans, the youngest, Illyricum, Italy, and Africa. To his nephew Dalmatius, he gave Thrace, Macedon, and Achaia; and to king Anibalbanus, his other nephew, Armenia Minor, Pontus, Cappadocia, and the city of Cæsarea, which he desired might be the capital of his kingdom.

After the death of Constantine, the army and senate proclaimed his three sons emperors, without taking any notice of his two nephews, who were soon after murdered, with Julius Constantius the late emperor's brother, and all their friends and adherents. Thus the family of Constantine was at once reduced to his three sons, and two nephews, Gallus and Julian, the sons of Julius Constantius : and of these the former owed his life to a malady, from which no one thought he could recover; and the latter to his infancy, being then at most about seven years of age. The three brothers divided among themselves the dominions of the deceased princes; but did not long agree together. In 340, Constantine having in vain solicited Constantius to yield part of Italy to him, raised a considerable army; and under pretence of marching to the assistance of his brother Constantius, who was then at war with the Persians, made himself master of several places in Italy. Hereupon, Constantius detached part of his army against him; and Constantine, being drawn into an ambuscade near Aquileia, was cut off with his whole forces. His body was thrown into the river Ansa; but being afterwards discovered, was sent to Constantinople, and interred there near the tomb of his father.

By the defeat and death of his brother, Constant remained sole master of all the western part of the empire, in the quiet possession of which he continued till the year 350. This year, Magnentius, the son of one Magnus, a native of Germany, finding Constant despised by the army on account of his indolence and inactivity, resolved to murder him, and set up for himself. Having found means to gain over the chief officers of the army to his designs, he seized on the Imperial palace at Autun, and distributed among the populace what sums he found there; which induced not only the city, but the neighbouring country, to espouse his cause. But Constant being informed of what had passed, and finding himself unable to resist the usurper, fled towards Spain. He was overtaken, however, by Galio whom Magnentius had sent after him with a

Constantinopolitan history.

5
He takes a
number of
Sarmatians
into his ar-
my.

6
His death,
and divi-
sion of the
empire.

7
All his relations murdered except his three sons and two nephews.

8
Constantine
invades the
dominions
of Con-
stans.

9
Is defeated
and killed.

10
Constans
sole master
of the
West.

11
Magnentius
revolts a-
gainst him.

Constantinopolitan history.

12
Constantians murdered.

13
Three pretenders to the empire.

14
Nepotianus makes himself master of Rome.

15
He is defeated and killed.

16
Tyranny of Magnentius.

17
Sends proposals of peace to Constantius.

chosen body of troops, who dispatched with many wounds the unhappy prince at Helena, a small village situated near the foot of the Pyrenees.

Thus Constantius acquired a right to the whole Roman empire; though one half of it was seized by Magnentius after the murder of Constantians. The former had been engaged in a war with the Persians, in which little advantage was gained on either side; but the Persians now giving no more disturbance, the emperor marched against the usurpers in the west. Besides Magnentius, there were at this time two other pretenders to the western empire. Veterano, general of the foot in Pannonia, had, on the first news of the death of Constantians, caused himself to be proclaimed emperor by the legions under his command. He was a native of Upper Mesia, and advanced in years when he usurped the sovereignty; but so illiterate, that he then first learned to read. The third pretender was Flavius Popilius Nepotianus, son of Eutropia the sister of Constantine the Great. Having assembled a company of gladiators and men of desperate fortunes, he assumed the purple on the third of June 350, and in that attire presented himself before the gates of Rome. The prefect Anicetus, who commanded there for Magnentius, sallied out against him with a body of Romans; who were soon driven back into the city. Soon after Nepotianus made himself master of the city itself, which he filled with blood and slaughter. Magnentius being informed of what had happened, sent against this new competitor his chief favourite and prime minister Marcellinus. Nepotianus received him with great resolution; a bloody battle ensued between the soldiers of Magnentius and the Romans who had espoused the cause of Nepotianus; but the latter being betrayed by a senator, named *Heracitus*, his men were put to flight, and he himself killed, after having enjoyed the sovereignty only 28 days. Marcellinus ordered his head to be carried on the point of a lance through the principal streets of the city; put to death all those who had declared for him; and under pretence of preventing disturbances, commanded a general massacre of all the relations of Constantine. Soon after, Magnentius himself came to Rome to make the necessary preparations for resisting Constantius, who was exerting himself to the utmost in order to revenge the death of his brother. In the city he behaved most tyrannically, putting to death many persons of distinction, in order to seize their estates; and obliged the rest to contribute half of what they were worth towards the expence of the war. Having by this means raised great sums, he assembled a mighty army composed of Romans, Germans, Gauls, Franks, Britons, Spaniards, &c. At the same time, however, dreading the uncertain issues of war, he dispatched ambassadors to Constantius with proposals of accommodation. Constantius set out from Antioch about the beginning of autumn; and, passing through Constantinople, arrived at *Heraclea*, where he was met by the deputies from Magnentius, and others from Veterano, who had agreed to support each other in case the emperor would hearken to no terms. The deputies of Magnentius proposed in his name a match between him and Constantia, or rather Constantina, the sister of Constantius, and widow of Annibalianus; offering, at

the same time, to Constantius the sister of Magnentius. At first the emperor would hearken to no terms; but afterwards, that he might not have to oppose two enemies at once, concluded a separate treaty with Veterano, by which he agreed to take him for his partner in the empire. But when Veterano ascended the tribunal along with Constantius, the soldiers pulled him down from thence, crying out that they would acknowledge no other emperor than Constantius alone. On this Veterano threw himself at the emperor's feet, and implored his mercy. Constantius received him with great kindness, and sent him to Prusia in Bithynia, where he allowed him a maintenance suitable to his quality.

Constantius, now master of all Illyricum, and of the army commanded by Veterano, resolved to march against Magnentius without delay. In the mean time, however, on advice that the Persians were preparing to invade the Eastern provinces, he married his sister Constantina to his cousin-german Gallus; created him Cæsar on the 15th of March; and allotted him for his share not only all the East, but likewise Thrace and Constantinople. About the same time Magnentius gave the title of Cæsar to his brother Decentius, whom he dispatched into Gaul to defend that country against the Barbarians who had invaded it; for Constantius had not only stirred up the Franks and Saxons to break into that province by promising to relinquish to them all the places they should conquer, but had sent them large supplies of men and arms for that purpose. On this encouragement the barbarians invaded Gaul with a mighty army, overthrew Decentius in a pitched battle, committed every where dreadful ravages, and reduced the country to a most deplorable situation. In the mean time Magnentius having assembled a numerous army, left Italy, and crossing the Alps, advanced into the plains of Pannonia, where Constantius, whose main strength consisted in cavalry, was waiting for him. Magnentius, hearing that his competitor was encamped at a small distance, invited him by a messenger to the extensive plains of *Sciscia* on the Save, there to decide which of them had the best title to the empire. This challenge was by Constantius received with great joy; but as his troops marched towards Sciscia in disorder, they fell into an ambuscade, and were put to flight with great slaughter. With this success, Magnentius was so elated, that he rejected all terms of peace which were now offered by Constantius; but after some time, a general engagement ensued at *Mursa*, in which Magnentius was entirely defeated, with the loss of 24,000 men. Constantius, though victor, is said to have lost 30,000, which seems improbable. All authors, however, agree, that the battle of *Mursa* proved fatal to the western empire, and greatly contributed to its speedy decline.

After his defeat at *Mursa*, Magnentius retired into Italy, where he recruited his shattered forces as well as he could. But the beginning of the following year 352, Constantius, having assembled his troops, surprised and took a strong castle on the Julian Alps, belonging to Magnentius, without the loss of a man. After this the emperor advanced in order to force the rest; upon which Magnentius was struck with such terror, that

Constantinopolitan history.

18
Gallus sent against the Persians.

19
Constantius stirs up the Franks to invade Gaul.

20
Is defeated by Magnentius.

21
Magnentius defeated at *Mursa*.

22
This battle fatal to the empire.

Constantinopolitan history.

Constantinopolitan history.

27
Tyranny of Gallus.

that he immediately abandoned Aquileia, and ordered the troops that guarded the other passes of the Alps to follow him. Thus Constantius entering Italy without opposition, made himself master of Aquileia. From thence he advanced to Pavia, where Magnentius gained a considerable advantage over him. Notwithstanding this loss, however, Constantius reduced the whole country bordering on the Po, and Magnentius's men deserted to him in whole troops, delivering up to him the places they had garrisoned; by which the tyrant was so disheartened, that he left Italy, and retired with all his forces into Gaul. Soon after this, Africa, Sicily, and Spain, declared for Constantius; upon which Magnentius sent a senator, and after him some bishops, to treat of a peace; but the emperor treated the senator as a spy, and sent back the bishops without any answer.—Magnentius now finding his affairs desperate, and that there were no hopes of pardon, recruited his army in the best manner he could, and dispatched an assassin into the East to murder Gallus Cæsar; hoping that his death would oblige the emperor to withdraw his forces from Gaul, and march in person to the defence of the Eastern provinces, which were threatened by the Persians. The assassin gained over some of Gallus's guards; but the plot being discovered before it could be put in execution, they were all seized and executed as traitors.

23
Magnentius attempts to get Gallus murdered.

24
Magnentius defeated a second time, kills all his family and himself.

In 353, the war against Magnentius was carried on with more vigour than ever, and at last happily ended by a battle fought in the higher Dauphiny. Magnentius, being defeated, took shelter in Lyons; but the few soldiers who attended him, despairing of any further success, resolved to purchase the emperor's favour by delivering up to him his rival, the author of so calamitous a war. Accordingly they surrounded the house where he lodged; upon which the tyrant, in despair, flew with his own hand his mother, his brother Desiderius whom he had created Cæsar, and such of his friends and relations as were with him; and then, fixing his sword in a wall, threw himself upon it, in order to avoid a more shameful death which he had reason to apprehend.

After the death of Magnentius, his brother Decentius Cæsar, who was marching to his assistance, and had already reached Sens, finding himself surrounded on all sides by the emperor's forces, chose rather to strangle himself than fall alive into the hands of his enemies. Thus Constantius was left sole master of the Roman empire. His panegyricists tell us, that after his victory he behaved with the greatest humanity, forgiving and receiving into favour his greatest enemies; but other historians differ considerably from them, and tell us that Constantius now became haughty, imperious, and cruel, of which many instances are given.

25
Constantius sole master of the empire.

26
Many grievous calamities.

This year the empire was subjected to very grievous calamities. Gaul was ravaged by the barbarians beyond the Rhine, and the disbanded troops of Magnentius. At Rome, the populace rose on account of a scarcity of provisions. In Asia, the Issaurian robbers over-ran Lycæonia and Pamphylia; and even laid siege to Seleucia, a city of great strength; which, however, they were not able to make themselves masters of. At the same time, the Saracens committed dread-

ful ravages in Mesopotamia, the Persians also invaded the province of Anthemusia on the Euphrates. But the Eastern provinces were not so much harried by the barbarians as by Gallus Cæsar himself, who ought to have protected them. That prince was naturally of a cruel, haughty, and tyrannical disposition; but being elated with his successes against the Persians, he at last behaved more like a tyrant and a madman than a governor. His natural cruelty is said to have been heightened by the indignations of his wife Constantina, who is by Ammianus styled the *Megeia*, or "fury of her sex;" and he adds, that her ambition was equal to her cruelty. Thus all the provinces and cities in the East were filled with blood and slaughter. No man, however innocent, was sure to live or enjoy his estate a whole day; for Gallus's temper being equally suspicious and cruel, those who had any private enemies took care to accuse them of crimes against the state, and with Gallus it was the same thing to be accused and condemned. At last the emperor being informed from all quarters of the evil conduct of his brother-in-law, and being at the same time told that he aspired to the sovereignty, resolved upon his ruin. For this end he wrote letters to Gallus and Constantina, inviting them both into Italy. Though they had both sufficient reason to fear the worst, yet they durst not venture to disobey the emperor's express command. Constantina, who was well acquainted with her brother's temper, and hoped to pacify him by her artful insinuations, set out first, leaving Gallus at Antioch; but she had scarce entered the province of Bithynia, when she was seized with a fever which put an end to her life. Gallus now despairing of being able to appease his sovereign, thought of openly revolting; but most of his friends deserted him on account of his inconsistent and cruel temper, so that he was at last obliged to submit to the pleasure of Constantius. He advanced therefore, according to his orders; but at Pætavius was arrested, and stripped of all the ensigns of his dignity. From thence he was carried to *Fianona*, now *Fianone* in Dalmatia, where he was examined by two of his most inveterate enemies. He confessed most of the crimes laid to his charge; but urged as an excuse the evil counsels of his wife Constantina. The emperor, provoked at this plea which reflected on his sister, and instigated by the enemies of Gallus, signed a warrant for his execution, which was performed accordingly.

28
He is put to death.

All this time the emperor had been engaged in a war with the Germans: he had marched against them in person; and though he gained no advantage, the barbarians thought proper to make peace with him. This, however, was but short-lived. No sooner was the Roman army withdrawn, than they began to make new inroads into the empire. Against them Constantius dispatched Arbeto with the flower of the army; but he fell into an ambushade, and was put to flight with the loss of a great number of men. This loss, however, was soon retrieved by the valour of *Arintheus*, who became famous in the reign of Valens, and of two other officers, who falling upon the Germans, without waiting the orders of their general, put them to flight, and obliged them to leave the Roman territories.

The tranquillity of the empire, which ensued on this

29
War with the Germans.

Constantinopolitan history. 30
Sylvanus betrayed by Arbeto.

this repulse of the Germans, was soon interrupted by a pretended conspiracy, by which in the end a true one was produced. Sylvanus, a leading man among the Franks, commanded in Gaul, and had there performed great exploits against the barbarians. He had been raised to this post by Arbeto; but only with a design to remove him from the emperor's presence, in order to accomplish his ruin, which he did in the following manner. One *Dynames*, keeper of the emperor's mules, leaving Gaul, begged of Sylvanus letters of recommendation to his friends at court; which being granted, the traitor eraled all but the subscription. He then inserted directions to the friends of Sylvanus for the carrying on a conspiracy; and delivering these forged letters to the prefect Lamprius, they were by him shewed to the emperor. Thus Sylvanus was forced to revolt, and cause himself to be proclaimed emperor by the troops under his command. In the mean time, however, Dynames having thought proper to forge another letter, the fraud was discovered, and an inquiry set on foot, which brought to light the whole matter. Sylvanus was now declared innocent, and letters sent to him by the emperor confirming him in his post; but these were scarce gone, when certain news arrived at court of Sylvanus having revolted, and caused himself to be proclaimed emperor. Constantius, thunderstruck at this news, dispatched against him Ursicinus, an officer of great integrity, as well as valour and experience in war; who forgetting his former character, pretended to be Sylvanus's friend, and thus found means to cut him off by treachery.

[31]
Is murdered.

32
Gaul ravaged by the barbarians.

33
Julian created Cæsar.

The barbarians, who had been hitherto kept quiet by the brave Sylvanus, no sooner heard of his death, than they broke into Gaul with greater fury than ever. They took and pillaged above forty cities, and among the rest Cologne, which they levelled with the ground. At the same time the Quadi and Sarmatians entering Pannonia, destroyed every thing with fire and sword. The Persians also, taking advantage of the absence of Ursicinus, over-ran, without opposition, Armenia and Mesopotamia; Prosper and Mausolus, who had succeeded that brave commander in the government of the East, being more intent upon pillaging than defending the provinces committed to their care. Constantius, not thinking it advisable to leave Italy himself, resolved at last to raise his cousin Julian, the brother of Gallus, to the dignity of Cæsar. Julian seems to have been a man of very extraordinary talents; for though before this time he had been entirely buried in obscurity, and conversed only with books, no sooner was he put at the head of an army than he behaved with the same bravery, conduct and experience, as if he had been all his life bred up to the art of war. He was appointed governor of Gaul; but before he set out, Constantius gave him in marriage his sister Helena, and made him many valuable presents. At the same time, however, the jealous emperor greatly limited his authority; gave him written instructions how to behave; ordered the generals who served under him to watch all his actions no less than those of the enemy; and strictly enjoined Julian himself not to give any largesses to the soldiery.

Julian set out from Milan on the 1st of December

355, the emperor himself accompanying him as far as Pavia, from whence he pursued his journey to the Alps, attended only by 360 soldiers. On his arrival at Turin he was first acquainted with the loss of Cologne, which had been kept concealed from the emperor. He arrived at Vienne before the end of the year, and was received by the people of that city and the neighbourhood with extraordinary joy.

In 356, the barbarians besieged *Autun*; to relieve which place, Julian marched with what forces he could raise. When he came there he found the siege raised; on which he went in pursuit of the barbarians to Auxerre, crossing with no small danger thick woods and forests, from Auxerre to *Troies*. On his march he was surrounded on all sides by the barbarians, who moved about the country in great bodies; but he put them to flight with an handful of men, cut great numbers of them in pieces, and took some prisoners. From Troies he hastened to Rheims, where the main body of the army, commanded by Marcellus, waited his arrival. Leaving Rheims, he took his route towards Decempagi, now *Dieuze*, on the Scille in Lorraine, with a design to oppose the Germans who were busy in ravaging that province. But the enemy attacking his rear unexpectedly, would have cut off two legions, had not the rest of the army, alarmed at the sudden noise, turned back to their assistance. A few days afterwards he defeated the Germans, though with great loss to his own army; the victory, however, opened him a way to Cologne. This city he found abandoned by the barbarians. They had neglected to fortify it: but Julian commanded the ancient fortifications to be repaired with all possible expedition, and the houses to be rebuilt; after which he retired to Sens, and there took up his winter-quarters. This year also Constantius entered Germany on the side of Rætia, laid waste the country far and wide; and obliged the barbarians to sue for peace, which was readily granted. The same year he enacted two laws; by one of which it was declared capital to sacrifice, or pay any kind of worship, to idols; the other, granting the effects of condemned persons to belong to their children and relations within the third degree, except in cases of magic and treason; but this last one he revoked two years after.

In the beginning of the year 357, the barbarians besieged Julian a whole month in Sens; Marcellus, the commander in chief, never once offering to assist him. Julian, however, so valiantly defended himself with the few forces he had, that the barbarians at last retired. After this, Constantius declared Julian commander in chief of all the forces in Gaul; appointing under him one *Severus*, an officer of great experience, and of a quite different disposition from Marcellus. On his arrival in Gaul, Julian received him with great joy, raised new troops, and supplied them with arms which he luckily found in an old arsenal. The emperor, resolved at all events to put a stop to the terrible devastations committed by the barbarous nations, chiefly by the Alemans, wrote to Julian to march directly against them. At the same time he sent Barbatio, who had been appointed general in place of Sylvanus, with a body of 25 or 30,000 men, out of Italy, in order to inclose the enemy between two armies.

Constantinopolitan history. 34
He sets out for Gaul.

35
Defeats the barbarians.

36
Repairs the fortifications of Cologne.

37
Idolatry declared capital by Constantius.

Constantinopolitan history.

38 The Leti cut off by Julian.

39 He forces the barbarians to abandon the islands of the Rhine.

43 Entirely defeats them at Strasbourg

41 He enters Germany and concludes a truce with the barbarians.

The Leti, however, a German nation, passing between the armies, advanced as far as Lyons, hoping to surprise that wealthy city; but meeting with a warmer reception than they expected, contented themselves with ravaging the country all round it. On the first notice of this expedition, Julian detached strong parties to guard the passages through which he knew the barbarians must return. Thus they were all cut off except those who marched near the camp of Barbatio; who was so far from cutting off their retreat, that he complained by a letter to Constantius of some officers for attempting it. These officers, among whom was Valentinian afterwards emperor of the West, were, by the orders of Constantius, cashiered for their disobedience. The other barbarians either fortified themselves in the countries which they had seized, stopping up all the avenues with huge trees, or took shelter in the islands formed by the Rhine. Julian resolved first to attack the latter; and with this view demanded some boats of Barbatio: but he, instead of complying with his just request, immediately burnt all his boats, as he did on another occasion the provisions which had been sent to both armies, after he had plentifully supplied his own. Julian, not in the least disheartened with this unaccountable conduct, persuaded some of the most resolute of his men to wade over to one of the islands. Here they killed all the Germans who had taken shelter in it. They then seized their boats, and pursued the slaughter in several other islands, till the enemy abandoned them all, and retired to their respective countries with their wives and what booty they could carry. On their departure, Barbatio attempted to lay a bridge of boats over the Rhine; but the enemy, apprised of his intention, threw a great number of huge trees into the river, which being carried by the stream against the boats, sunk several of them, and parted the rest. The Roman general then thought proper to retire; but the barbarians falling unexpectedly upon him in his retreat, cut great numbers of his men in pieces, took most of his baggage, laid waste the neighbouring country, and returned in triumph loaded with booty. Elated with this success, they assembled in great numbers under the command of *Chnodomarius*, a prince of great renown among them, and six other kings. They encamped in the neighbourhood of Strasbourg. Here they were encountered by Julian; who put them to flight, with the loss of 6 or 8000 of their men slain in the field, and a vastly greater number drowned in the river; while Julian himself lost only 243 private men, and 4 tribunes. In this action *Chnodomarius* was taken, and sent to Rome, where he soon after died.

After the battle, Julian advanced with all his army to *Magenae*, where he built a bridge over the Rhine and entered Germany, having with difficulty prevailed upon his army to follow him. Here he ravaged the country till the time of the autumnal equinox, when being prevented by snow from advancing any further, he began to repair the fort of Trajan, by some supposed to be the castle of Cromburgh, about three or four leagues from Frankfort. The barbarians were now so much alarmed, that they sent deputies to treat of a peace; but this Julian refused to grant them upon

any terms. He consented, however, to a truce for seven months, upon their promising to store with provisions the fort he was building in their country. This year Constantius made some remarkable laws. By one he punished with confiscation such as renounced the Christian for the Jewish religion; and, by another addressed to Felix bishop of Rome, he exempted all merchandizing ecclesiastics, with their wives, children, and domestics, from every imposition ordinary and extraordinary; supposing the gains they made to be applied by them to the relief of the poor.

In 358, as soon as the season was fit for action, Julian took the field against the Franks, with a design to conquer them before the truce he had concluded with the Alemans was expired. The Franks were at that time divided into several tribes, the most powerful of which were the Sali and Chamavi. The first of these sent deputies, intreating that he would suffer them to remain as friends to the empire in the country they possessed. But Julian, without paying any regard to this deputation, entered their country, and obliged them to submit; after which he allotted them lands in Gaul, incorporating great numbers of them into his cavalry. He next marched against the Chamavi, whom he defeated and obliged to retire beyond the Rhine. Afterwards he rebuilt three forts on the river Meuse, which had been destroyed by the barbarians; but wanting provisions in a country so often ravaged, he ordered 6 or 800 vessels to be built in Britain for the conveying corn from thence into Gaul. Julian continued in the country of the Chamavi till the expiration of his truce with the Alemans; and then laying a bridge of boats over the Rhine, he entered their country, putting all to fire and sword. At last two of their kings came in person to him to sue for peace: which Julian granted, upon their promising to set at liberty the captives they had taken; to supply a certain quantity of corn when required; and to furnish wood, iron, and carriages, for repairing the cities they had ruined. The prisoners whom he at this time released, amounted to upwards of 20,000.

Soon after the vernal equinox of this year 358, Constantius marched in person against the Quadi and Sarmatians, whose country lay beyond the Danube. Having crossed that river on a bridge of boats, he laid waste the territories of the Sarmatians; who thereupon came in great numbers, together with the Quadi, pretending to sue for peace. Their true design was to surprise the Romans; but the latter suspecting it, fell upon them sword in hand, and cut them all in pieces. This obliged the rest to sue for peace in good earnest, which was granted on the delivery of hostages. The emperor then marched against the *Limigantes*, that is, the slaves who, in 334, had driven the Sarmatians out of their country, and seized it for themselves*. They used the same artifice as the Sarmatians and Quadi had done, coming in great numbers under pretence of submitting, but prepared to fall upon him unexpectedly if opportunity offered. The emperor, observing their sly looks, and distrusting them, caused his troops surround them insensibly while he was speaking. The *Limigantes* then displeased with the conditions he offered them, laid their hands on their swords; on which they were attacked by the Roman soldiers. Finding

Constantinopolitan history.

42 Remarkable laws of Constantius.

43 Julian conquers the Franks.

44 Grants a peace to the Germans.

45 Expedition of Constantius against some German nations.

* See n^o 5.

Constanti-
nopolitan
history.

46
He expels
the Limi-
gantes.

47
Haughty
embassy
from Sapor
of Persia.

48
A law to
gainst ma-
gicians, &c.

49
Treachery
of the Limi-
gantes.

it impossible to make their escape, they made with great fury towards the tribunal, but were repelled by the guards forming themselves into a wedge, and every one of them cut in pieces. After this, the emperor ravaged their country to such a degree, that they were in the end obliged to submit to the only condition he thought proper to allow them, which was to quit their country and retire to a more distant place. The country was then restored to the Sarmatians who were its original possessors.

This year is also remarkable for a very haughty embassy from Sapor king of Persia. The ambassador, named *Narfer*, brought a letter, in which the Persian monarch styled himself "king of kings, brother of the sun and moon," &c. He acquainted the emperor that he might lawfully insist on having all the countries beyond the river *Strymon* in *Macedon* delivered up to him; but lest his demands should seem unreasonable, he would be contented with *Armenia* and *Mesopotamia*, which had been most unjustly taken from his grandfather *Narfer*. He added, that unless justice was done him, he was resolved to assert his right by force of arms. This letter was presented to *Constantius* wrapped up in a piece of white silk; but he, without entering into any negotiation with the ambassador, wrote a letter to *Sapor*, in which he told him, that as he had maintained the Roman dominions in their full extent, when he was possessed only of the East, he could not suffer them to be curtailed now when he was master of the whole empire. In a few days, however, he sent another letter with rich presents; being very desirous at least to put off the war till he had secured the northern provinces against the incursions of the barbarians, that he might then employ all the forces of the empire against so formidable an enemy. This embassy proved unsuccessful, as did also another which was sent soon after. The last ambassadors were imprisoned as spies, but afterwards dismissed unhurt. By a law of *Constantius* dated in 358, all magicians, augurs, astrologers, and pretenders to the art of divination, were declared enemies to mankind; and such of them as were found in the court either of the emperor or of *Julian*, he commanded to be put to the torture, and specified what torments they were to undergo.

In 359, *Julian* continued his endeavours for relieving the province of *Gaul*, which had suffered so much from the incursions of the barbarians. He erected magazines in different places, visited the cities which had suffered most, and gave orders for repairing their walls and fortifications properly. He then crossed the *Rhine*, and pursued the war in *Germany* with great success, inasmuch that the barbarians submitted to such terms as he pleased to impose. In the mean time the emperor, having received intelligence that the *Limigantes* had quitted the country in which he had placed them, hastened to the banks of the *Danube*, in order to prevent their entering *Pannonia*. On his arrival he sent deputies desiring to know what had induced them to abandon the country which had been allotted them. The *Limigantes* answered, in appearance with the greatest submission imaginable, that they were willing to live as true subjects of the empire in any other place; but that the country he had allotted

them was quite uninhabitable, as they could demonstrate if they were but allowed to cross the river, and lay their complaints before him. This request was granted; but while he attended his tribunal, the barbarians unexpectedly fell upon his guards sword in hand, killed several of them, and the emperor with difficulty saved himself by flight. The rest of the troops, however, soon took the alarm, and surrounding the *Limigantes*, cut them all off to a man. This year *Constantius* instituted a court of inquisition against all those who consulted heathen oracles. *Paulus Catena*, a noted and cruel informer, was dispatched into the East to prosecute them; and *Modestus*, then count of the East, and equally remarkable for his cruelty, was appointed judge. His tribunal was erected at *Scythopolis* in *Palestine*, whither persons of both sexes, and of every rank and condition, were daily dragged in crowds from all parts, and either confined in dungeons, or torn in pieces in a most cruel and barbarous manner by racks, or publicly executed.

In 359, *Sapor* king of Persia began hostilities, being encouraged thereto by the absence of *Urficinus*, whom the emperor had recalled, and appointed in his room one *Sabinianus*, a person very unfit for such an office. During this campaign, however, he made very little progress; having only taken two Roman forts, and destroyed the city of *Amida*, the siege of which is said to have cost him 30,000 men. On the first news of the Persian invasion, *Constantius* had thought proper to send *Urficinus* into the East; but his enemies prevented him from receiving the supplies necessary for carrying on the war, so that he found it impossible to take any effectual means for stopping the progress of the Persians. On his return, he was unexpectedly charged with the loss of *Amida*, and all the disasters that had happened during the campaign. Two judges were appointed to inquire into his conduct; but they, being creatures of his enemies, left the matter doubtful. On this *Urficinus* was so much exasperated, that he appealed to the emperor, and in the heat of passion, let fall some unguarded expressions, which being immediately carried to the emperor, the general was deprived of all his employments.

Constantius resolved to march next year in person against the Persians; but in the mean time, dreading to encounter so formidable an enemy, he applied himself wholly to the assembling of a mighty army, by which he might be able fully to cope with them. For this purpose he wrote to *Julian* to send him part of his forces, without considering that by so doing he left the province of *Gaul* exposed to the ravages of the barbarians. *Julian* resolved immediately to comply with the emperor's orders; but at the same time to abate the dignity of *Cæsar*, that he might not be blamed for the loss of the province. Accordingly he suffered the best soldiers to be draughted out of his army. They were, however, very unwilling to leave him, and at last proclaimed him emperor. Whether this was done absolutely against *Julian's* consent or not is uncertain; but he wrote to the emperor, and persuaded the whole army also to send a letter along with his, in which they acquainted *Constantius* with what had happened, and entreated him to acknowledge *Julian* as

Constanti-
nopolitan
history.

50
They are
all cut off.

51
The hea-
thens cru-
elly perse-
cuted.

52
The Persi-
ans begin
hostilities.

53
Constantius
marches in
person a-
gainst them.

54
Julian pro-
claimed em-
peror.

his

Constantinopolitani hitor.

his partner in the empire. But this was positively refused by Constantius, who began to prepare for war. Julian then, desiring to be before-hand with the emperor, caused his troops take an oath of allegiance to himself, and with surprising expedition made himself master of the whole country of Illyricum, and the important pass separating that country from Thrace. Constantius was thunder-struck with this news; but hearing that the Persians had retired, he marched with all his forces against his competitor. On his arrival at Tarsus in Cilicia, he was seized with a feverish distemper, occasioned chiefly by the uneasiness and perplexity of his mind. He pursued his march, however, to *Mopsucenus*, a place on the borders of Cilicia, at the foot of Mount Taurus. Here he was obliged to stop by the violence of his disorder, which increased every day, and at last carried him off on the 13th of November 361, in the 45th year of his age.

55
Constantianus
marches against him,
but dies.

56
Julian re-
stores the
heathen re-
ligion.

By the death of Constantius, Julian now became master of the whole Roman empire without a rival. But he had been educated in the Christian religion; but secretly apostatized from it long before, and as soon as he saw himself master of Illyricum, openly avowed his apostasy, and caused the temples of the gods to be opened. When the messengers arrived at Naissus in Illyricum, where he then was, to acquaint him with his being sole master of the empire, they found him consulting the entrails of victims concerning the event of his journey. As the omens were uncertain, he was at that time very much embarrassed and perplexed; but the arrival of the messengers put an end to all his fears, and he immediately set out for Constantinople. At Heraclea he was met by almost all the inhabitants of this metropolis, into which he made his public entry on the 11th of December 361, being attended by the whole senate in a body, by all the magistrates, and by the nobility magnificently dressed, every one testifying the utmost joy at seeing such a promising young prince raised to the empire without bloodshed. He was again declared emperor by the senate of Constantinople; and as soon as that ceremony was over, he caused the obsequies of Constantius to be performed with great pomp.

57
Condemns
some of the
late emper-
or's mini-
sters.

The first care of Julian was to inquire into the conduct of the late emperor's ministers. Several of these, having been found guilty of enormous crimes, were condemned and executed; particularly the noted informer *Paulus Catena*, and another named *Apodamus*, were sentenced to be burnt alive. Along with these, however, was put to death one *Ursula*, a man of unexceptionable character, and to whom Julian himself was highly indebted. He had been supplied with money by Ursula unknown to the emperor, at the time when he was sent into Gaul with the title of Cæsar, but without the money necessary for the support of that dignity. For what reason he was now put to death, historians do not acquaint us. Julian himself tells us that he was executed without his knowledge.

58
Reforms
the court.

The emperor next set about reforming the court. As the vast number of offices was in his time become an intolerable burden, he discharged all those whom he thought useless. He reduced, among the rest, the officers called *agentes in rebus*, from 10,000 to 17; and discharged thousands of cooks, barbers, &c. who

by their large salaries drained the exchequer. The *curiosi*, whose office it was to inform the emperor of what had passed in the different provinces, were all discharged, and that employment entirely suppressed. Thus he was enabled to ease the people of the heavy taxes with which they were loaded: and this he did by abating a fifth part of all taxes and imposts throughout the kingdom.

As to religious matters, Julian, as before observed, was a Pagan, and immediately on his accession to the throne, restored the heathen religion. He invited to court, the philosophers, magicians, &c. from all parts; nevertheless he did not raise any persecution against the Christians. On the contrary, he recalled from banishment all the orthodox bishops who had been sent into exile during the former reign; but with a design, as is observed both by the Christian and Pagan writers, to raise disturbances and sow dissensions in the church.

As the Persians were now preparing to carry on the war with vigour, Julian found himself under a necessity of marching against them in person. But before he set out, he enriched the city of Constantinople with many valuable gifts. He formed a large harbour to shelter the ships from the south wind, built a magnificent porch leading to it, and in another porch a stately library, in which he lodged all his books. In the month of May, A.D. 362, he set out for Antioch, and on the first of January renewed in that city the sacrifices to Jupiter for the safety of the empire, which had been so long omitted. During his stay in this city, he continued his preparations for the Persian war, erecting magazines, making new levies, and above all consulting the oracles, aruspices, magicians, &c. The oracles of Delphi, Delos, and Dodona, assured him of victory. The aruspices, indeed, and most of his courtiers and officers, did all that lay in their power to divert him from his intended expedition; but the deceitful answers of the oracles and magicians, and the desire of adding the Persian monarch to the many kings he had already seen humbled at his feet, prevailed over all other considerations. Many nations sent deputies to him offering their assistance, but these offers he rejected, telling them that the Romans were to assist their allies, but stood in no need of any assistance from them. He likewise rejected, and in a very disobliging manner, the offers of the Saracens; answering them, when they complained of his stopping the pension paid them by other emperors, that a warlike prince had steel, but no gold; which they resenting, joined the Persians, and continued faithful to them to the last. However, he wrote to Arfaces king of Armenia, enjoining him to keep his troops in readiness to execute the orders he should soon transmit to him.

Having made the necessary preparations for so important an enterprise, Julian sent orders to his troops to cross the Euphrates, designing to enter the enemy's country before they had the least notice of his march; for which purpose he had placed guards on all the roads. From Antioch he proceeded to Litarba, a place about 15 leagues distant, which he reached the same day. From thence he went to Beraa, where he halted a day, and exhorted the council to restore the worship of the gods; but this exhortation, it seems, was com-

Constantinopolitani hitor.

59
Recalls the
philosophers, magicians, &c.

60
Marches against the Persians.

61
Crosses the Euphrates.

Constanti-
nopolitan
history.

plied with but by few. From *Beræa* he proceeded to *Batnæ*; and was better pleased with the inhabitants of the latter, because they had, before his arrival, restored the worship of the gods. There he offered sacrifices; and having immolated a great number of victims, he pursued the next day his journey to *Hierapolis*, the capital of the province of *Euphratesiana*, which he reached on the 9th of March. Here he lodged in the house of one for whom he had a particular esteem, chiefly because neither *Constantius* nor *Gallus*, who had both lodged in his house, had been able to make him renounce the worship of his idols. As he entered this city 50 of his soldiers were killed by the fall of a porch. He left *Hierapolis* on the 13th of March; and having passed the *Euphrates* on a bridge of boats, came to *Batnæ* a small city of *Osroene*, about 10 leagues from *Hierapolis*; and here 50 more of his soldiers were killed by the fall of a stack of straw. From *Batnæ* he proceeded to *Carrhæ*; where, in the famous temple of the moon, it is said he sacrificed a woman to that planet.

66
Invades
Persia.

While *Julian* continued in this city, he received advice that a party of the enemies horse had broke into the Roman territories. On this he resolved to leave an army in *Mesopotamia*, to guard the frontiers of the empire on that side, while he advanced on the other into the heart of the Persian dominions. This army consisted, according to some, of 20,000, according to others, of 30,000 chosen troops. It was commanded by *Procopius*, and *Sebastian* a famous manichean who had been governor of *Egypt*, and had persecuted there, with the utmost cruelty, the orthodox Christians. These two were to join, if possible, *Arfaces* king of *Armenia*, to lay waste the fruitful plains of *Media*, and meet the emperor in *Assyria*. To *Arfaces* *Julian* himself wrote, but in the most dissembling manner imaginable, threatening to treat him as a rebel if he did not execute, with the utmost punctuality, the orders given him; and at the conclusion told him, that the God he adored would not be able to screen him from his indignation.

There were two roads leading from *Carrhæ* to *Persia*: the one to the left by *Nisibis*; the other to the right through the province of *Assyria*, along the banks of the *Euphrates*. *Julian* chose the latter, but caused magazines to be erected on both roads; and after having viewed his army, set out on the 25th of March. He passed the *Abora*, which separated the Roman and Persian dominions, near its conflux with the *Euphrates*; after which he broke down the bridge, that his troops might not be tempted to desert, seeing they could not return home. As he proceeded on his march, a soldier and two horses were struck dead by a flash of lightning; and a lion of an extraordinary size presenting himself to the army, was in a moment dispatched by the soldiers with a shower of darts. These omens occasioned great disputes between the philosophers and aurificers: the latter looking upon them as inauspicious, advised the emperor to return; but the former refuted their arguments with others more agreeable to *Julian's* temper.

67
Lays waste
Assyria.

Having passed the *Abora*, *Julian* entered *Assyria*, which he found very populous, and abounding with all the necessaries of life; but he laid it waste far and

near, destroying the magazines and provisions which he could not carry along with him; and thus he put it out of his power to return the same way he came, a step which was judged very impolitic. As he met with no army in the field to oppose him, he advanced to the walls of *Ctesiphon*, the metropolis of the Persian empire; having reduced all the strong holds that lay in his way. Here, having caused the canal to be cleared, which was formerly dug by *Trajan* between these two rivers, he conveyed his fleet from the former to the latter. On the banks of the *Tigris* he was opposed by the enemy. But *Julian* passed that river in spite of their utmost efforts, and drove them into the city with the loss of a great number of their men, he himself, in the mean time, losing only 70 or 75.

Julian had now advanced so far into the enemy's country, that he found it necessary to think of a retreat, as it was impossible for him to winter in *Persia*. For this reason he made no attempt on *Ctesiphon*, but began to march back along the banks of the *Tigris*, soon after he had passed that river. In the mean time the king of *Persia* was assembling a formidable army, with a design to fall upon the Romans in their march; but being desirous of putting an end to so destructive a war, he sent very advantageous proposals of peace to *Julian*. These the Roman emperor very imprudently rejected; and soon after, deceived by treacherous guides, he quitted the river, and entered into an unknown country totally laid waste by the enemy, and where he was continually harried by strong parties, who in a manner surrounded his army, and attacked him sometimes in the front, and sometimes in the rear. A still worse step he was persuaded to take by the treacherous guides already mentioned; and this was to burn his fleet, lest it should fall into the hands of the enemy. As soon as the fleet was set on fire, the whole army cried out, that the emperor was betrayed, and that the guides were traitors employed by the enemy. *Julian* ordered them immediately to be put to the rack, upon which they confessed the treason; but it was too late. The fleet was already in flames; they could by no means be extinguished; and no part was saved except 12 vessels, which were designed to be made use of in the building of bridges, and for this purpose were conveyed over land in waggons.

The emperor thus finding himself in a strange country, and his army greatly dispirited, called a council of his chief officers, in which it was resolved to proceed to *Corduene*, which lay south of *Armenia*, and belonged to the Romans. With this view, they had not proceeded far when they were met by the king of *Persia*, at the head of a very numerous army, attended by his two sons, and all the principal nobility of the kingdom. Several sharp encounters happened, in which though the Persians were always defeated, yet the Romans reaped no advantages from their victories, but were reduced to the last extremity for want of provisions. In one of these skirmishes, when the Romans were suddenly attacked, the emperor, eager to repulse the enemy, hastened to the field of battle without his armour, when he received a mortal wound by a dart, which, through his arm and side, pierced his very liver. Of this wound he died the same night,

Constanti-
nopolitan
history.68
Advances
to Ctesiphon.69
Begins his
retreat, but
is distressed
for want of
provisions.70
Is mortally
wounded in
a sudden
attack by
the Persians.

the

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71
Jovian
restored to the empire.

the 26th of June 363, in the 32^d year of his age, after having reigned scarce 20 months from the time he became sole master of the Roman empire.

As Julia had declined naming any successor, the choice of a new emperor devolved on the army. They unanimously chose Jovian, a very able commander, whose father had lately resigned the post of *comes domesticorum*, in order to lead a retired life. The valour and experience of Jovian, however, were not sufficient to extricate the Roman army from the difficulties in which they had been plunged by the imprudence of his predecessor. The famine raged in the camp to such a degree, that not a single man would have been left alive, had not the Persians unexpectedly sent proposals of peace. These were now received with the utmost joy. A peace was concluded for 30 years; the terms of which were, that Jovian should restore to the Persians the five provinces which had been taken from them in the reign of Dioclesian, with several castles, and the cities of Nisibis and Singara. After the conclusion of the treaty, Jovian pursued his march without molestation. When he arrived at Antioch, he revoked all the laws that had been made in the former reign against Christianity and in favour of paganism. He espoused also the cause of the orthodox Christians against the Arians; and recalled all those who had been formerly banished, particularly Athanasius, to whom he wrote a very obliging letter with his own hand. It is generally believed also that Athanasius, at the desire of Jovian, now composed the creed which still goes by his name, and is subscribed by all the bishops in Europe. But this emperor did not live to make any great alterations, or even to visit his capital as emperor; for in his way to Constantinople he was found dead in his bed, on the 16th or 17th of February 364, after he had lived 33 years, and reigned seven months and 40 days.

73
His death.74
Valentinian
chosen emperor,
chooses Valens for his partner.

After the death of Jovian, Valentinian was chosen emperor. Immediately on his accession the soldiers mutinied, and with great clamour required him to choose a partner in the sovereignty. Though he did not instantly comply with their demand, yet in a few days he chose his brother Valens for his partner; and, as the empire was threatened on all sides with an invasion of the barbarous nations, he thought proper to divide it. This famous partition was made at Mediana in Dacia; when Valens had for his share the whole of Asia, Egypt, and Thrace; and Valentinian all the West; that is, Illyricum, Italy, Gaul, Spain, Britain, and Africa.

75
Procopius
revolts.

After this partition, Valens returned to Constantinople, where the beginning of his reign was disturbed by the revolt of Procopius, a relation of Julian. On the death of that emperor, he had fled into Taurica Cherfoneus for fear of Jovian; but not trusting the barbarians who inhabited that country, he returned in disguise into the Roman territories, where having gained over an eunuch of great wealth, by name *Eugenius*, lately disgraced by Valens, and some officers who commanded the troops sent against the Goths, he got himself proclaimed emperor. At first he was joined only by the lowest of the people, but at length he was acknowledged by the whole city of Constantinople. On the news of this revolt, Valens would

have abdicated the sovereignty, had he not been prevented by the importunities of his friends. He therefore dispatched some troops against the usurper; but these were gained over, and Procopius continued for some time to gain ground. It is probable he would finally have succeeded, had he not become so much elated with his good fortune, that he grew tyrannical and insupportable to his own party. In consequence of this alteration in his disposition, he was first abandoned by some of his principal officers; and soon after defeated in battle, taken prisoner, and put to death.

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76
Is defeated and put to death.77
War with the Goths.

This revolt produced a war betwixt Valens and the Goths. The latter, having been solicited by Procopius, had sent 3000 men to his assistance. On hearing the news of the usurper's death, they marched back; but Valens detached against them a body of troops, who took them all prisoners notwithstanding the vigorous resistance they made. Athanasius, king of the Goths, expostulated on this proceeding with Valens; but that emperor proving obstinate, both parties prepared for war. In 367 and 369, Valens gained great advantages over his enemies; and obliged them to sue for peace, which was concluded upon terms very advantageous to the Romans. The rest of this reign contains nothing remarkable, except the cruelty with which Valens persecuted the orthodox clergy. The latter felt 80 of their number to him, in order to lay their complaints before him; but he, instead of giving them any relief, determined to put them all to death. But the person who was ordered to execute this sentence, fearing lest the public execution of so many ecclesiastics might raise disturbances, ordered them all to be put on board a ship, pretending that the emperor had ordered them only to be sent into banishment; but when the vessel was at some distance from land, the mariners set fire to it, and made their own escape in the boat. The ship was driven by a strong wind into an harbour, where it was consumed and all that were in it. A persecution was also commenced against magicians, or those who had books of magic in their custody. This occasioned the destruction of many innocent persons; for books of this kind were often conveyed into libraries unknown to the owners of them, and this was certainly followed by death and confiscation of goods. Hereupon persons of all ranks were seized with such terror that they burnt their libraries, lest books of magic should have been secretly conveyed in amongst the others.

78
Eighty orthodox clergy ecclesiastics put to death.79
Magicians persecuted.

In 378, the Goths whom Valens had admitted into Thrace, advanced from that province to Macedon and Thessaly, where they committed dreadful ravages. They afterwards blocked up the city of Constantinople, plundered the suburbs, and at last totally defeated and killed the emperor himself. The day after the battle, hearing that an immense treasure was lodged in Adrianople, the barbarians laid siege to that place: but being quite strangers to the art of besieging towns, they were repulsed with great slaughter; upon which they dropped that enterprize, and returned before Constantinople. But here great numbers of them were cut in pieces by the Saracens, whom *Maria* their queen had sent to the assistance of the Romans; so that they were obliged to abandon this de-

80
Valens defeated and killed by the Goths.

Constantinople likewise, and retire from the neighbourhood of that city.

81
Gratian takes Theodosius for his partner.

By the death of Valens, the empire once more fell into the hands of a single person. This was *Gratian*, who had held the empire of the West after the death of Valentinian. He repulsed many barbarous nations who threatened the empire at that time with dissolution; but finding himself pressed on all sides, he soon resolved to take a colleague, in order to ease him of some part of the burden. Accordingly, on the 19th of January 379, he declared Theodosius his partner in the empire, and committed to his care all the provinces which had been governed by Valens.

82
Miserable state of the empire on his accession.

Theodosius is greatly extolled by the historians of those ages on account of his extraordinary valour and piety; and for these qualifications has been honoured with the surname of the *Great*. From the many persecuting laws, however, made in his time, it would seem that his piety was at least very much misguided; and that if he was naturally of a humane and compassionate disposition, superstition and passion had often totally obscured it. He certainly was a man of great conduct and experience in war, and indeed the present state of the empire called for an exertion of all his abilities. The provinces of Dacia, Thrace, and Illyricum, were already lost; the Goths, Taifali, Alans, and Huns, were masters of the greatest part of these provinces, and had ravaged and laid waste the rest. The Iberians, Armenians, and Persians, were likewise up in arms, and ready to take advantage of the distracted state of the empire. The few soldiers, who had survived the late defeat, kept within the strong holds of Thrace, without daring so much as to look abroad, much less face the victorious enemy, who moved about the country in great bodies. But notwithstanding this critical situation, the historians of those times give us no account of the transactions of the year 379. Many great battles indeed are said to have been fought, and as many victories obtained by Theodosius; but the accounts of these are so confused and contradictory, that no stress can be laid upon them.

83
The Goths defeated by Theodosius.

In the month of February 380, Theodosius was seized with a dangerous malady, so that Gratian found himself obliged to carry on the war alone. This emperor, apprehending that the neighbouring barbarians might break into some of the provinces, concluded a peace with the Goths, which was confirmed by Theodosius on his recovery. The treaty was very advantageous to the barbarians; but they, disregarding all their engagements, no sooner heard that Gratian had left Illyricum, than they passed the Danube, and breaking into Thrace and Pannonia, advanced as far as Macedon, destroying all with fire and sword. Theodosius, however, drawing together his forces, marched against them; and, according to the most respectable authorities, gained a complete victory; though Zosimus relates, that he was utterly defeated.

The following year, Athanaric, the most powerful of all the Gothic princes, being driven out by a faction at home, resorted to Theodosius, by whom he was received with great tokens of friendship. The emperor himself went out to meet him, and attended him with his numerous retinue into the city. The

Gothic prince died the same year; and Theodosius caused him to be buried after the Roman manner with such pomp and solemnity, that the Goths, who attended him in his flight, returned home with a resolution never to molest the Romans any more. Nay, out of gratitude to the emperor, they took upon them to guard the banks of the Danube, and prevent the empire from being invaded on that side.

In 383, one Maximus revolted against Gratian in Britain; and in the end, having got the unhappy emperor into his power, caused him to be put to death, and assumed the empire of the West himself. Gratian had divided his dominions with his brother Valentinian, whom he allowed to reign in Italy and West Illyricum, reserving the rest to himself. Maximus therefore, immediately after his usurpation, sent deputies to Theodosius, assuring him that he had no designs on the dominions of Valentinian. As Theodosius at that time found himself in danger from the barbarians, he not only forbore to attack Maximus after this declaration, but even acknowledged him for his partner in the empire. It was not long, however, before the ambition of the usurper prompted him to break his promise. In 387, he passed the Alps on a sudden, and meeting with no opposition marched to Milan where Valentinian usually resided. The young prince fled first to Aquileia; and from thence to Thessalonica, to implore the protection of Theodosius. The latter, in answer to Valentinian's letter, informed him, that he was not at all surprised at the progress Maximus had made, because the usurper had protected, and Valentinian had persecuted, the orthodox Christians. At last he prevailed on the young prince to renounce the Arian heresy which he had hitherto maintained; after which Theodosius promised to assist him with all the forces of the East. At first, however, he sent messengers to Maximus, earnestly exhorting him to restore the provinces he had taken from Valentinian, and content himself with Gaul, Spain, and Britain. But the usurper would hearken to no terms. This very year he besieged and took Aquileia, Quaderna, Bononia, Mutina, Rhegium, Placentia, and many other cities in Italy. The following year he was acknowledged in Rome, and in all the provinces of Africa. Theodosius therefore, finding a war inevitable, spent the remaining months of this and the beginning of the following year in making the necessary preparations. His army consisted chiefly of Goths, Huns, Alans, and other barbarians, whom he was glad to take into the service in order to prevent their raising disturbances on the frontiers. He defeated Maximus in two battles, took him prisoner, and put him to death. The usurper had left his son Victor, whom he created Augustus, in Gaul, to awe the inhabitants in his absence. Against him the emperor dispatched Arbogastes, who took him prisoner after having dispersed the troops that attended him, and put him to death. The victory was used afterwards by Theodosius with great clemency and moderation.

In 389, Theodosius took a journey to Rome; and, according to Prudentius, at this time converted the senate and people from idolatry to Christianity. The next year was remarkable for the destruction of the celebrated temple of Serapis in Alexandria; which, according

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84
Gratian murdered by Maximus,

85
Who invades the dominions of Valentinian.

86
His success.

87
Defeated and put to death by Theodosius.

88
The temples in Alexandria, and throughout all Egypt, destroyed.

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according to the description of Ammianus Marcellinus, surpassed all others in the world, that of Jupiter Capitolinus alone excepted. The reason of its being now destroyed was as follows. Theophilus, bishop of Alexandria, having begged and obtained of the emperor an old temple, formerly consecrated to Bacchus, but then ruined and forsaken, with a design to convert it into a church, the workmen found among the rubbish several obscene figures, which the bishop, to ridicule the superstition of the heathens, caused to be exposed to public view. This provoked the Pagans to such a degree that they flew to arms; and falling unexpectedly upon the Christians, cut great numbers of them in pieces. The latter, however, soon took arms in their own defence; and being supported by the few soldiers who were quartered in the city, began to repel force by force. Thus a civil war was kindled, and no day passed without some encounter. The Pagans used to retire to the temple of Serapis; and thence falling out unexpectedly seized on such Christians as they met, and, dragging them into the temple, either forced them by the most exquisite torments to sacrifice to their idol, or, if they refused, racked them to death. As they soon expected to be attacked by the emperor's troops, they chose a philosopher, named *Olympus*, for their leader, with a design to defend themselves to the last extremity. The emperor, however, would not suffer any punishment to be inflicted upon them for the lives of those they had taken away, but readily forgave them; however, he ordered all the temples of Alexandria to be immediately pulled down, and commanded the bishop to see his orders put in execution. The Pagans no sooner heard that the emperor was acquainted with their proceedings than they abandoned the temple, which was in a short time destroyed by Theophilus; nothing being left except the foundations, which could not be removed on account of the extraordinary weight and size of the stones. Not satisfied with the destruction of the Alexandrian temples, the zealous bishop encouraged the people to pull down all the other temples, oratories, chapels, and places set apart for the worship of the heathen gods throughout Egypt, and the statues of the gods themselves to be either burnt or melted down. Of the innumerable statues which at that time were to be found in Egypt, he is said to have spared but one, viz. that of an ape, in order to expose the Pagan religion to ridicule. On his return to Constantinople, Theodosius ordered such temples as were yet standing to be thrown down, and the Arians to be every where driven out of the cities.

In 392, Valentinian, emperor of the West, was treacherously murdered by Arbogastes his general; who, though he might afterwards have easily seized on the sovereignty himself, chose to confer it upon one Eugenius, and to reign in his name. This new usurper, though a Christian, was greatly favoured by the Pagans, who were well apprised that he only bore the title of emperor, while the whole power lodged in Arbogastes, who pretended to be greatly attached to their religion. The auspices began to appear a-new, and informed him that he was destined to the empire of the whole world; that he would soon gain a complete victory over Theodosius, who was as much

hated as Eugenius was beloved by the gods, &c. But though Eugenius seemed to favour the Pagans, yet in the very beginning of his reign he wrote to St Ambrose. The holy man did not answer his letter till he was pressed by some friends to recommend them to the new prince; and then he wrote to this infamous usurper with all the respect due to an emperor. Soon after his accession to the empire, Eugenius sent deputies to Theodosius; and they are said to have been received by him in a very obliging manner. He did not, however, intend to enter into any alliance with this usurper, but immediately began his military preparations. In 394, he set out from Constantinople, and was at Adrianople on the 15th of June that year. He bent his march through Dacia, and the other provinces between Thrace and the Julian Alps, with a design to force the passes of these mountains, and break into Italy before the army of Eugenius was in a condition to oppose him. On his arrival at the Alps, he found these passes guarded by Flavianus prefect of Italy, at the head of a considerable body of Roman troops. These were utterly defeated by Theodosius, who thereupon crossed the Alps and advanced into Italy. He was soon met by Eugenius; and a bloody battle ensued, without any decisive advantage on either side. The next day the emperor led his troops in person against the enemy, utterly defeated them, and took their camp. Eugenius was taken prisoner by his own men and brought to Theodosius, who reproached him with the murder of Valentinian, with the calamities he had brought on the empire by his unjust usurpation, and with putting his confidence in Hercules, and not in the true God; for on his chief standard he had displayed the image of that fabulous hero. Eugenius begged earnestly for his life; but while he lay prostrate at the emperor's feet, his own soldiers cut off his head, and carrying it about on the point of a spear, shewed it to those in the camp, who had not yet submitted to Theodosius. At this they were all thunderstruck; but being informed that Theodosius was ready to receive them into favour, they threw down their arms and submitted. After this Arbogastes despairing of pardon fled to the mountains; but being informed that diligent search was made for him, he laid violent hands on himself. His children, and those of Eugenius, took sanctuary in churches: but the emperor not only pardoned, but took the opportunity of converting them to Christianity, restored to them their paternal estates, and raised them to considerable employments in the state. Soon after this Theodosius appointed his son Honorius emperor of the West, assigning him for his share, Italy, Gaul, Spain, Africa, and west Illyricum. The next year, as he prepared for his return to Constantinople, he was seized with a dropsy, owing to the great fatigues he had undergone during the war. As soon as he perceived himself to be in danger, he made his will, by which he bequeathed the empire of the East to Arcadius, and confirmed Honorius in the possession of the West. He likewise confirmed the pardon which he had granted to all those who had borne arms against him, and remitted a tribute which had proved very burdensome to the people; and charged his two sons to see these points of his will executed. He died at Milan on the 17th of January 395, in the 16th of his reign, and 50th of his age.

From

89
Valentinian murdered by Arbogastes who raises Eugenius to the empire.

90
Eugenius defeated, taken prisoner, and put to death.

91
Arbogastes lays violent hands on himself.

92
Theodosius dies.

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nopolitan
history.

94
Empire u-
raptured by
Basiliscus.

95
Is starved
to death.

96
Great fire
at Constanti-
nople.

From the time of Theodosius to the time when the Roman empire in the West was totally destroyed by the Goths, we find but very little remarkable in the history of Constantinople. At this time the eastern empire was usurped by Basiliscus, who had driven out Zeno the lawful emperor; being assisted in his conspiracy by the empress Verina his sister. Zeno fled into Isauria, whither he was pursued by *Illus* and *Trecondes*, two of the usurper's generals; who having easily defeated the few troops he had with him, forced the unhappy prince to shut himself up in a castle, which they immediately invested. But in a short time Basiliscus having dissembled the people by his cruelty, avarice, and other bad qualities, for which he was no less remarkable than his predecessor had been, his generals joined with Zeno whom they restored to the throne. After his restoration, Zeno having got Basiliscus into his power, confined him in a castle of Cappadocia together with his wife Zenonides, where they both perished with hunger and cold. This happened in the year 477, after Basiliscus had reigned about 20 months. During the time of this usurpation a dreadful fire happened at Constantinople, which consumed great part of the city, with the library containing 120,000 volumes; among which were the works of Homer, written as is said on the great gut of a dragon 120 feet long.

The misfortunes which Zeno had undergone did not work any reformation upon him. He still continued the same vicious courses which had given occasion to the usurpation of Basiliscus. Other conspiracies were formed against him, but he had the good fortune to escape them. He engaged in a war with the Ostrogoths, in which he proved unsuccessful, and was obliged to yield the provinces of Lower Dacia and Mœsia to them. In a short time, however, Theodoric their king made an irruption into Thrace, and advanced within 15 miles of Constantinople, with a design to besiege that capital: but the following year 485, they retired in order to attack Odoacer king of Italy; of which country Theodoric was proclaimed king in 493. The emperor Zeno died in the year 491, in the 65th year of his age, and 17th of his reign.

The Roman empire had now for a long time been on the decline: the ancient valour and military discipline which had for such a long time rendered the Romans superior to other nations, had greatly degenerated; so that they were now by no means so powerful as formerly. The tumults and disorders which had happened in the empire from time to time by the many usurpations, had contributed also to weaken it very much. But what proved of the greatest detriment was the allowing vast swarms of barbarians to settle in the different provinces, and to serve in the Roman empire in separate and independent bodies. This had proved the immediate cause of the dissolution of the western empire; but as it affected the eastern parts less, the Constantinopolitan empire continued for upwards of 900 years after the western one was totally dissolved. The weak and imprudent administration of Zeno and Anastasius who succeeded him, had reduced the eastern empire still more; and it might possibly have expired in a short time after the western one, had not the wife and vigorous conduct of Justin, and

97
Decline of
the Roman
empire, to
what ow-
ing.

98
It revives
under Jus-
tinian.

his partner Justinian, revived in some measure the ancient martial spirit which had originally raised the Roman empire to its highest pitch of grandeur.

Justin ascended the throne in 518. In 521 he engaged in a war with the Persians, who had all along been very formidable enemies to the Roman name. Against them he employed the famous Belisarius; but of him we hear nothing remarkable till after the accession of Justinian. This prince was the nephew of Justin, and was by him taken as his partner in the empire in 527; and the same year Justin died, in the 77th year of his age and 9th of his reign. Justinian being now sole master of the empire, bent his whole force against the Persians. The latter proved successful in the first engagement; but were soon after utterly defeated by Belisarius on the frontiers of Persia, and likewise by another general named *Dorotheus* in Armenia. The war continued with various success during the first five years of Justinian's reign. In the sixth year a peace was concluded upon the following terms: 1. That the Roman emperor should pay to Cosroes the king of Persia, 1000 pounds weight of gold. 2. That both princes should restore the places they had taken during the wars. 3. That the commander of the Roman forces should no longer reside at Daras on the Persian frontiers, but at a place called *Constantina* in Mesopotamia, as he had formerly done. 4. That the Iberians, who had sided with the Romans, should be at liberty to return to their own country, or stay at Constantinople. This peace, concluded in 532, was styled *eternal*; but in the event proved of very short duration.

About this time happened at Constantinople the greatest tumult mentioned in history. It began among the different factions in the circus, but ended in an open rebellion. The multitude, highly dissatisfied with the conduct of John the *presidus prætoris*, and of Trebonianus then questor, forced *Hypatius*, nephew to the emperor Anastasius, to accept the empire, and proclaimed him with great solemnity in the forum. As the two above mentioned ministers were greatly abhorred by the populace on account of their avarice, Justinian immediately discharged them, hoping by that means to appease the tumult: but this was so far from answering the purpose, that the multitude only grew the more outrageous upon it; and most of the senators joining them, the emperor was so much alarmed, that he had thoughts of abandoning the city and making his escape by sea. In this dilemma the empress Theodora encouraged and persuaded him rather to part with his life than the kingdom; and he at last resolved to defend himself to the utmost, with the few senators who had not yet abandoned him. In the mean time the rebels having attempted in vain to force the gates of the palace, carried Hypatius in triumph to the circus; where, while he was beholding the sports from the imperial throne, amidst the shouts and acclamations of the people, Belisarius, who had been recalled from Persia, entered the city with a considerable body of troops. Being then applied of the usurpation of Hypatius, he marched straight to the circus; fell sword in hand upon the disarmed multitude; and with the assistance of a band of Heruli, headed by Mundus governor of Illyricum, cut about

Constanti-
nopolitan
history.

99
Justinian's
war with
the Persi-
ans.

100
Great tu-
mult in
Constanti-
nople.

Constantinopolitan history.

30,000 of them in pieces. Hypatius the usurper, and Pompeius another of the nephews of Anastasius, were taken prisoners and carried to the emperor, by whose orders they were both beheaded, and their bodies cast into the sea. Their estates were confiscated, and likewise the estates of such senators as had joined with them; but the emperor caused great part of their lands and effects to be afterwards restored, together with their honours and dignities, to their children.

Justinian having now no other enemy to contend with, turned his arms against the Vandals in Africa, and the Goths in Italy; both which provinces he recovered out of the hands of the barbarians*. But before his general Belisarius had time to establish fully the Roman power in Italy, he was recalled in order to carry on the war against Cosroes king of Persia, who, in defiance of the treaty formerly concluded in 540, entered the Roman dominions at the head of a powerful army. The same year, however, a peace was concluded between the two nations upon the following conditions: 1. That the Romans should, within two months, pay to the Persian king 5000 pounds weight of gold, and an annual pension of 500. 2. That the Persians should relinquish all claim to the fortresses of Daras, and maintain a body of troops to guard the Caspian gates, and prevent the barbarians from breaking into the empire. 3. That upon payment of the above mentioned sum, Cosroes should immediately withdraw his troops from the Roman dominions. The treaty being signed, and the stipulated sum paid, Cosroes began to march back again; but by the way plundered several cities as if the war had still continued. Hereupon Justinian resolved to pursue the war with the utmost vigour; and for that purpose dispatched Belisarius into the East. But soon after, he was obliged to recall him in order to oppose the Goths who had gained great advantages in Italy after his departure. The Persian war was then carried on with indifferent success till the year 558, when a peace was concluded upon the emperor again paying an immense sum to the enemy. The same year the Huns, passing the Danube in the depth of winter, marched in two bodies directly for Constantinople; and laying waste the countries through which they passed, came, without meeting the least opposition, within 150 furlongs of the city. But Belisarius marching out against them with an handful of men, put them to flight; the emperor, however, to prevent them from invading the empire anew, agreed to pay them an annual tribute, upon their promising to defend the empire against all other barbarians, and to serve in the Roman armies when required. This was the last exploit performed by Belisarius, who on his return to Constantinople was disgraced, stripped of all his employments, and confined to his house, on pretence of a conspiracy against the emperor*. In the year 565 a real conspiracy was formed against Justinian, which he happily escaped, and the conspirators were executed; but the emperor did not long survive it, being carried off by a natural death in 566, in the 39th year of his reign.

During the reign of Justinian, the majesty of the Roman empire seemed to revive. He recovered the provinces of Italy and Africa out of the hands of the barbarians, by whom they had been held for a num-

ber of years; but after his death they were soon lost, and the empire tended fast to dissolution. In 569 Italy was conquered by the Lombards, who held it for the space of 200 years. Some amends, however, was made for this loss by the acquisition of *Perfarmania*; the inhabitants of which, being persecuted by the Persians on account of the Christian religion which they professed, revolted to the Romans. This produced a war between the two nations, who continued to weaken each other, till at last the Persian monarchy was utterly overthrown, and that of the Romans greatly reduced by the Saracens†. These new enemies attacked the Romans in the year 632, and pursued their conquests with incredible rapidity. In the space of four years they reduced the provinces of Egypt, Syria, and Palestine. In 648 they were also masters of Mesopotamia, Phenicia, Africa, Cyprus, Aradus, and Rhodes; and having defeated the Roman fleet, commanded by the emperor Constantine in person, they concluded a peace on condition of keeping the vast extent of territory they had seized, and paying for it 1000 nummi a-year.

An expedition against the Lombards was about this time undertaken, but with very little success, a body of 20,000 Romans being almost entirely cut off by one of the Lombard generals. In 671 the Saracens ravaged several provinces, made a descent in Sicily, took and plundered the city of Syracuse, and over-ran the whole island, destroying every thing with fire and sword. In like manner they laid waste Cilicia; and having passed the winter at Smyrna, they entered Thrace in the winter of the year 672, and laid siege to Constantinople itself. Here, however, they were repulsed with great loss; but next spring they renewed their attempt, in which they met with the same bad success; many of their ships being burnt by the *sea-fire*, as it was called, because it burnt under water; and in their return home their fleet was wrecked off the Scyllæan promontory. At last a peace was concluded for 30 years, on condition that the Saracens should retain all the provinces they had seized; and that they should pay to the emperor and his successors 3000 pounds weight of gold, 50 slaves, and as many choice horses.

This peace was scarce concluded, when the empire was invaded by a new enemy, who proved very troublesome for a long time. These were the Bulgarians; who breaking into Thrace, defeated the Roman army sent against them, and ravaged the country far and wide. The emperor consented to pay them an annual pension, rather than continue a doubtful war; and allowed them to settle in Lower Mæsia, which from them was afterwards called *Bulgaria*. In 687, they were attacked by Justinian II. who entered their country without provocation, or regarding the treaties formerly concluded with them. But they falling suddenly upon him, drove him out of their country, and obliged him to restore the towns and captives he had taken. In 697, this emperor was deposed; and in his exile fled to Trebelis king of the Bulgarians, by whom he was kindly entertained, and by whose means he was restored to his throne; but soon forgetting this favour, he invaded the country of the Bulgarians, with a design to wrest from them those provinces

Constantinopolitan history.

Decline of the empire after Justinian.

† See Arabia.

Unsuccessful expedition against the Lombards.

Constantinople besieged by the Saracens.

Empire invaded by the Bulgarians.

See Bar-
gory and
Gibbs.
101
Another
war with
the Persi-
ans.

102
Peace con-
cluded.

See Beli-
sarius.

Constanti-
nopolitan
history.

107
They de-
feat Jus-
tinian II.

108
Their coun-
try cruelly
ravaged by
Nicepho-
rus.

109
Who is cut
off with his
whole ar-
my.

110
Their coun-
try invaded
by Bas-
ilius II.

provinces which he had yielded to them. He was at-
tended in this expedition by no better success than his
ingratitude deserved, his army being utterly defeated,
and he himself obliged to make his escape in a light
vessel to Constantinople. The Bulgarians continued
their inroads and ravages at different times, generally
defeating the Romans who ventured to oppose them,
till the year 800, the seventh of the reign of Nicepho-
rus, when they surprised the city of Sardica in Mœsia,
and put the whole garrison consisting of 6000 men to
the sword. The emperor marched against them with
a considerable army: but the enemy retired at his ap-
proach; and he, instead of pursuing them, returned to
Constantinople. Two years after, he entered Bulgar-
ia at the head of a powerful army, destroying every
thing with fire and sword. The king offered to con-
clude a peace with him upon honourable terms; but
Nicephorus, rejecting his proposals, continued to waste
the country, destroying the cities, and putting all the
inhabitants, without distinction of sex or age, to the
sword. The king was so much affected with these
cruelties which were exercised on his subjects, that he
sent a second embassy to Nicephorus, offering to con-
clude a peace with him upon any terms, provided he
would quit his country. But Nicephorus dismissing the
ambassadors with scorn, the Bulgarian monarch attacked
unexpectedly the Roman camp, forced it, and cut off al-
most the whole army, with the emperor himself, and a
great number of patricians. His successor Michael like-
wise engaged in a war with the Bulgarians; but being
utterly defeated, he was so grieved that he resigned the
empire. After this the Bulgarians continued to be very
formidable enemies to the empire, till the year 979,
when they were attacked by Basilus II. The Bulgar-
ians were at that time governed by a king named
Samuel; who having ravaged the Roman territories
as was the common practice of his nation, Basilus sent
against him one Nicephorus Uranus at the head of a
powerful army. Uranus, leaving his baggage at La-
rissa, reached by long marches the Sperchius, and
encamped with his whole army over against the en-
emy, who lay on the opposite bank. As the river
was greatly swelled with the heavy rains that had
lately fallen, Samuel, not imagining the Romans would
attempt to pass it, suffered his troops to roam in large
parties about the country in quest of booty. But Uran-
us having at length found out a place where the river
was fordable, passed it in the dead of the night with-
out being perceived. He then fell upon the Bulgari-
ans who were left in the camp, and lay for the most
part asleep; cut great numbers of them in pieces; took
a great number of prisoners, with all their baggage;
and made himself master of their camp. Samuel
and his son were dangerously wounded; and would
have been taken, had they not all that day conceal-
ed themselves among the dead. The next night
they stole away to the mountains of *Ætolia*, and from
thence made their escape into Bulgaria. The follow-
ing year the emperor entered Bulgaria at the head of
a numerous and well-disciplined army; defeated Sa-
muel in a pitched battle, and took several strong cities.
The emperor himself, however, at last, narrowly es-
caped being cut off with his whole army; being unex-
pectedly attacked by the Bulgarians in a narrow pass.

From this danger he was relieved by the arrival of
Nicephorus Xiphias, governor of Philippopolis, with a
considerable body of troops; who falling upon the
enemies rear, put them to flight. Basilus pursued
them close; and having taken an incredible number of
captives, caused their eyes to be pulled out, leaving to
every hundred a guide with one eye, that he might
conduct them to Sammel. This shocking spectacle so
affected the unhappy king, that he fell into a deep
swoon, and died two days after. The Roman emper-
or pursued his conquests, and in the space of two
years made himself master of most of the enemies
strong holds. He defeated also the successor of Sa-
muel in several engagements; and having at last
killed him in battle, the Bulgarians submitted them-
selves without reserve. The vast treasures of their
princes were by Basilus distributed among his soldiers
by way of donative. Soon after, the widow of the
late king, with her six daughters and three of her
sons, surrendered themselves to the Roman emperor,
by whom they were received with the utmost civility
and respect. This obliging behaviour encouraged the
three other sons of the late king, and most of the
princes of the blood, who had taken shelter in the
mountains, to submit, and throw themselves on the
emperor's mercy.

Ibatzes, however, a person nearly allied to the
royal family, who had distinguished himself in a very
eminent manner during the whole course of the war,
refused to submit, and tied to a steep and craggy moun-
tain, with a design to defend himself there to the last
extremity. Basilus endeavoured to cause him submit
by fair means, but he equally despised both threats and
promises. At last Eustathius Daphnomelus, whom
Basilus had lately appointed governor of Achridus,
the chief city of Bulgaria, undertook to secure him by
a most desperate and improbable scheme. Without
communicating his design to any, he repaired, with
two persons in whom he could confide, to the moun-
tain on which Ibatzes had fortified himself. He hoped
to pass undiscovered among the many strangers who
flocked thither to celebrate the approaching feast of
the Virgin Mary, for whom Ibatzes had a particular
veneration. In this he found himself mistaken; for
he was known by the guards, and carried before the
prince. To him he pretended to have something of
importance to communicate; but as soon as Ibatzes
had retired with him into a remote place, Daphnome-
lus threw himself suddenly upon him, and with the as-
sistance of the two men whom he had brought with
him, pulled out both his eyes, and got (ide to an aban-
doned castle on the top of the hill. Here they were
immediately surrounded by the troops of Ibatzes; but
Daphnomelus exhorting them now to submit to the
emperor, by whom he assured them they would be
well received, they congratulated Daphnomelus on his
success, and suffered him to conduct the unhappy
Ibatzes a prisoner to Basilus. The emperor was no
less surprised than pleased at the success of this bold
attempt; and rewarded Daphnomelus with the go-
vernment of Dyrrhachium, and all the rich moveables
of his prisoner. After this, having accomplished the
entire reduction of Bulgaria, he returned to Const-
antinople with an incredible number of captives; where

Constanti-
nopolita
history.

111
His mon-
strous cru-
city.

112
The coun-
try subdu-
ed.

113
Ibatzes al-
one holds
out.

114
He is taken
by a strata-
gem.

Constantinopolitan history.

he was received by the senate and people with all possible demonstrations of joy.

All this time, the Saracens had at intervals invaded the Roman dominions, and even attempted to make themselves masters of Constantinople. Their internal divisions, however, rendered them now much less formidable enemies than they had formerly been; so that some provinces were even recovered for a time out of their hands; though the weak and distracted state of the empire rendered it impossible to preserve such conquests. But in 1041, the empire was invaded by an enemy, not very powerful at that time indeed, but who by degrees gathered strength sufficient to overthrow both the Roman and Saracen empires. These were the *Turks*; who having quitted their ancient habitations in the neighbourhood of mount Caucasus, and passed the Caspian freights, settled in Armenia Major, about the year 844. There they continued an unknown and despicable people, till the intestine wars of the Saracens gave them an opportunity of aggrandizing themselves. About the year 1030, Mohammed the son of *Sambracl* sultan of Persia, not finding himself a match for *Pisaris* sultan of Babylon, with whom he was at war, had recourse to the Turks, who sent him 3000 men under the command of one *Tangrolipix* a leading man among them. By their assistance Mohammed defeated his adversary; but when the Turks desired leave to return home, he refused to part with them. Upon this they withdrew without his consent to a neighbouring desert; and being there joined by several discontented Persians, began to make frequent inroads into the sultan's territories. Against them Mohammed immediately dispatched an army of 20,000 men; who, being surprised in the night, were utterly defeated by Tangrolipix. The fame of this victory drew multitudes to him from all parts; so that in a short time Tangrolipix saw himself at the head of 50,000 men. Upon this Mohammed marched against them in person, but was thrown from his horse in the beginning of the engagement and killed by the fall; upon which his men threw down their arms, and submitted to Tangrolipix.

After this victory the Turkish general made war upon the sultan of Babylon; whom he at length slew, and annexed his dominions to his own. He then sent his nephew, named *Cutla-Mofes*, against the Arabians; but by them he was defeated, and forced to fly towards Media. Through this province he was denied a passage by Stephen the Roman governor upon which Cutla-Mofes was obliged to force a passage by encountering the Roman army. These he put to flight, took the governor himself prisoner, and without any further opposition reached the confines of Persia, where he sold Stephen for a slave. Returning from thence to Tangrolipix, he excused, in the best manner he could, his defeat by the Arabians; but at the same time acquainted him with his victory over the Romans in Media, encouraging him to invade that fertile country, which he said might be easily conquered, as it was inhabited by none but *women*, meaning the Romans. At that time Tangrolipix did not hearken to his advice, but marched against the Arabians at the head of a numerous army. He was, however, attended with no better success than his nephew had been; and therefore be-

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gan to reflect on what he had told him. Soon after he sent *Asan* his brother's son with an army of 20,000 men to reduce Media. Pursuant to his orders the young prince entered that country, and committed every where dreadful ravages; but being in the end drawn into an ambush by the Roman generals, he was cut off with his whole army. Tangrolipix, noway discouraged by this misfortune, sent a new army into Media near 100,000 strong; who after having ravaged the country without opposition, laid siege to Artaza a place of great trade, and therefore reckoned the most wealthy in those parts. Not being able to reduce it by any other means, they set it on fire; and thus in a short time it was utterly destroyed: the buildings being reduced to ashes, and 150,000 of the inhabitants perishing either by the flame or the sword. After this *Abraham Halim*, half-brother to Tangrolipix, hearing that the Romans, reinforced with a body of troops under the command of *Liparites* governor of Iberia, had taken the field, marched against them, and offered them battle; which they not declining, the two armies engaged with incredible fury. The victory continued long doubtful; but at length inclined to the Romans; who nevertheless did not think proper to pursue the fugitives, as their general *Liparites* was taken prisoner. The emperor, greatly concerned for the captivity of *Liparites*, dispatched ambassadors with rich presents, and a large sum of money to redeem him, and at the same time to conclude an alliance with Tangrolipix. The sultan received the presents; but generously returned them together with the money to *Liparites*, whom he set at liberty without any ransom; only requiring him, at his departure, never more to bear arms against the Turks. Not long after, Tangrolipix sent a person of great authority among the Turks, with the character of ambassador, to Constantinople; who having arrogantly exhorted the emperor to submit to his master, and acknowledge himself his tributary, was ignominiously driven out of the city.

Tangrolipix, highly affronted at the reception his ambassador had met with, entered Iberia while the emperor Constantine Monomachus was engaged in a war with the *Patzinace*, a Scythian nation. Having ravaged that country, he returned from thence to Media; and laid siege to *Mantzichiarta*, a place defended by a numerous garrison, and fortified with a triple wall and deep ditches. However, as it was situated in an open plain country, he hoped to be master of it in a short time. But finding the besieged determined to defend themselves to the last extremity, he resolved to raise the siege, after he had continued it 30 days. One of his officers, however, named *Alcan*, prevailed on him to continue it but one day longer, and to commit the management of the attacks to him. This being granted, Alcan disposed his men with such skill, and so encouraged them by his example, that, notwithstanding the vigorous opposition they met with, the place would have probably been taken, had not Alcan been slain as he was mounting the wall. The besieged, knowing him by the richness of his armour, drew him by the hair into the city, and cutting off his head threw it over the wall among the enemy; which so disheartened them, that they gave over the assault and retired. The next

Constantinopolitan history.

118 A Turkish army entirely cut off - 119 They again invade the empire.

120 An obstinate engagement.

121 The Turks besiege Mantzichiarta.

122 The siege raised.

115 The empire invaded by the Turks.

116 Account of them.

117 They defeat the Romans.

Constantinopolitan history. spring Tangrolipix returned, and ravaged Iberia with the utmost cruelty, sparing neither sex nor age. But on the approach of the Roman army he retired to Tauris, leaving 30,000 men behind him to infest the frontiers of the empire. This they did with great success, the borders being through the avarice of Monomachus unguarded. Till the time of this emperor, the provinces bordering on the countries of the barbarians had maintained, at their own charge, forces to defend them; and were on that account exempted from paying tribute: but as Monomachus exacted from them the same sums that were paid by others, they were no longer in a condition to defend themselves.

In 1063 died the emperor Constantine Ducas, having left the empire to his three sons, Michael, Andronicus, and Constantine: but as they were all very young, he appointed the empress Eudocia regent during their minority, after having required of her an oath never to marry; which oath was with great solemnity lodged in the hands of the patriarch. He likewise obliged the senators solemnly to swear that they would acknowledge none for their sovereign but his three sons. No sooner, however, was he dead, than the Turks, hearing that the empire was governed by a woman, broke into Mesopotamia, Cilicia, and Cappadocia, destroying all with fire and sword. The empress was no way in a condition to oppose them, the greater part of the army having been disbanded in her husband's life-time, and the troops that were still on foot being undisciplined, and altogether unfit for service. The concern which this gave the empress, was aggravated by the seditious speeches of a discontented party at home, who repeated, on all occasions, that the present state of affairs required a man of courage and address at the helm, instead of a weak and helpless woman; and as they imagined the empress would never think of marrying, in consequence of the oath she had taken, they hoped by these speeches to induce the people to revolt, and chuse a new emperor. This Eudocia was aware of; and therefore determined to prevent the evils that threatened herself and her family, by marrying some person of merit who was capable of defeating her enemies both at home and abroad. At this time one *Romanus Diogenes*, a person of a most beautiful aspect, extraordinary parts, and illustrious birth, being accused of aspiring to the empire, tried and convicted, was brought forth to receive sentence of death. But the empress, touched with compassion at his appearance, gently upbraided him with his ambition, set him at liberty, and soon after appointed him commander in chief of all her forces. In this station he acquitted himself so well, that the empress resolved to marry him if she could but recover the writing in which her oath was contained out of the hands of the patriarch. In order to this she applied to a favourite eunuch; who going to the patriarch told him, that the empress was so taken with his nephew named *Bardas*, that she was determined to marry and raise him to the empire, provided the patriarch absolved her from the oath she had taken, and convinced the senate of the lawfulness of her marriage. The patriarch, dazzled with the prospect of his nephew's promotion, readily undertook to perform both.

He first obtained the consent of the senate by representing to them the dangerous state of the empire, and exclaiming against the rash oath which the jealousy of the late emperor had extorted from the empress. He then publicly discharged her from it; restored the writing to her; and exhorted her to marry some deserving person, who being entrusted with an absolute authority, might be capable of defending the empire. The empress, thus discharged from her oath, and married a few days after, *Romanus Diogenes*; who was thereupon proclaimed emperor, to the great disappointment of the patriarch.

As the new emperor was a man of great activity and experience in war, he no sooner saw himself vested with the sovereign power, than he took upon him the command of the army, and passed over into Asia with the few forces he could assemble, recruiting and insuring them on his march to military discipline, which had been utterly neglected in the preceding reigns. On his arrival in this continent, he was informed that the Turks had surprised and plundered the city of *Nicaesarea*, and were retiring with their booty. On this news he hastened after them at the head of a chosen body of light-armed troops, and came up with them on the third day. As the Turks were marching in disorder, without the least apprehension of an enemy, *Romanus* cut great numbers of them in pieces, and easily recovered the booty; after which he pursued his march to Aleppo, which he retook from them, together with Hierapolis, where he built a strong castle.

As he was returning to join the forces he had left behind him, he was met by a numerous body of cond victors, Turks, who attempted to cut off his retreat. At first he pretended to decline an engagement through fear; but attacked them afterwards with such vigour when they least expected it, that he put them to flight at the first onset, and might have gained a complete victory had he thought proper to pursue them. After this, several towns submitted to him; but the season being now far spent, the emperor returned to Constantinople. The following year he passed over into Asia early in the spring; and being informed that the Turks had sacked the rich city of Iconium, besides gaining other considerable advantages, he marched in person against them. But the Turks, not thinking it advisable to wait his coming, retired in great haste. The Armenians, however, encouraged by the approach of the emperor's army, fell upon the enemy in the plains of Tarsus, put them to flight, and stripped them both of their baggage and the booty they had taken. The spring following the emperor once more entered Asia at the head of a considerable army which he had raised, and with incredible pains disciplined during the winter. When the two armies drew near to each other, *Axan*, the Turkish Sultan, and son of the famous Tangrolipix, sent proposals to *Romanus* for a lasting and honourable peace. These were imprudently rejected, and a desperate engagement ensued, when, in spite of the utmost efforts of the emperor, his army was routed, and he himself wounded and taken prisoner. When this news was brought to Axan, he could scarcely believe it; but being convinced by the appearance of the royal captive

123 The empress Eudocia forced to swear that she will never marry.

124 The empress determines to break her oath.

125 She recovers the writing in which it was contained.

126 And marries Romanus Diogenes.

127 He passes over into Asia.

128 He defeats the Turks.

129 Gains a second victory.

130 They are defeated.

131 The Romans defeated and the emperor taken.

Constantinopolitan history.

in his presence, he tenderly embraced him, and addressed him in an affectionate manner: "Grieve not, said he, most noble emperor, at your misfortune; for such is the chance of war, sometimes overwhelming one, and sometimes another: you shall have no occasion to complain of your captivity; for I will not use you as my prisoner, but as an emperor." The Turk was as good as his word. He lodged the emperor in a royal pavilion; assigned him attendants, with an equipage suitable to his quality; and discharged such prisoners as he desired. After he had for some days entertained his royal captive with extraordinary magnificence, a perpetual peace was concluded betwixt them, and the emperor dismissed with the greatest marks of honour imaginable. He then set out with the Turkish ambassador for Constantinople, where the peace was to be ratified; but by the way he was informed that Eudocia had been driven from the throne by John the brother of Constantine Ducas, and Piellus a leading man in the senate, who had confined her to a monastery, and proclaimed her eldest son, Michael Ducas, emperor. On this intelligence, Romanus retired to a strong castle near Theodosiopolis, where he hoped in a short time to be joined by great numbers of his friends and adherents. But in the mean time John, who had taken upon him to act as guardian to the young prince, dispatched Andronicus with a considerable army against him. Andronicus having easily defeated the small army which Romanus had with him, obliged him to fly to Adana a city in Cilicia, where he was closely besieged, and at last obliged to surrender. Andronicus carried his prisoner into Phrygia, where he fell dangerously ill, being, as was suspected, secretly poisoned. But the poison being too slow in its operation, John ordered his eyes to be put out; which was done with such cruelty that he died soon after, in the year 1067, having reigned three years and eight months.

132 Eudocia deposed, and confined in a monastery.

133 Romanus put to death.

134 The Turks again invade the empire.

135 They defeat the Romans.

136 They gain a second victory.

Axan was no sooner informed of the tragical end of his friend and ally, than he resolved to invade the empire anew; and that not with a design only to plunder as formerly, but to conquer, and keep what he had once conquered. The emperor dispatched against him Isaac Comnenus, with a considerable army; but he was utterly defeated and taken prisoner by Axan. Another army was quickly sent off under the command of John Ducas the emperor's uncle. He gained at first some advantages, and would probably have put a stop to their conquests, had not one *Rufelius*, or *Urselius*, revolted with the troops he had under his command, caused himself to be proclaimed emperor, and reduced several cities in Phrygia and Cappadocia. Against him John marched with all his forces, and suffering the Turks in the mean time to pursue their conquests; but coming to an engagement with the rebels, his army was entirely defeated, and himself taken prisoner. Notwithstanding this victory, Rufelius was so much alarmed at the progress of the Turks, that he not only released his prisoner, but joined with him against the common enemy, by whom they were both defeated and taken prisoners. Axan, however, was for some time prevented from pursuing his conquests by Cutlu-Moses, nephew to the late Tangrolipix. He had revolted against his uncle; but being defeated by him in

a pitched battle, had taken refuge in Arabia, whence he now returned at the head of a considerable army, in order to dispute the sovereignty with Axan. But while the two armies were preparing to engage, the kalif of Babylon, who was still looked upon as the successor of the great prophet, interposed his authority. He represented the dangers of their intestine dissensions; and by his mediation, an agreement was at last concluded, on condition that Axan should enjoy undisturbed the monarchy lately left him by his father, and Cutlu-Moses should possess such provinces of the Roman empire as he or his sons should in process of time conquer.

After this agreement, both the Turkish princes turned their forces against the empire; and before the year 1077, made themselves masters of all Media, Lycaonia, Cappadocia and Bithynia, fixing the capital quarter of their empire at Nice in the latter province. During all this time, the emperors of Constantinople, as well as their subjects, seemed to be in a manner insatuated. No notice was taken of the great progress made by these barbarians. The generals were ambitious only of seizing the tottering empire, which seemed ready to fall a prey to the Turks; and, after it was obtained, spent their time in oppressing their subjects, rather than in making any attempts to repulse the enemy.

At last Alexius Comnenus, having wrested the empire from Nicephoru, Botoniates in 1077, began to prepare for opposing so formidable an enemy. But before he set out, as his soldiers had committed great outrages on his accession to the empire, he resolved to make confession of his sins, and do open penance for those he had suffered his army to commit. Accordingly he appeared in the attire of a penitent before the patriarch and several other ecclesiastics, acknowledged himself guilty of the many disorders that had been committed by his soldiers, and begged of the patriarch to impose upon him a penance suitable to the greatness of his crimes. The penance enjoined him and his adherents by the patriarch was to fast, lie upon the ground, and practise several other austerities for the space of 40 days. This command was religiously obeyed, and the emperor then began to prepare for war with so much vigour, that Solynian, the Turkish sultan, son and successor to Cutlu-Moses, dispatched ambassadors to Alexius with proposals of peace. These were at first rejected; but the emperor was at last glad to accept them on certain advice, that Robert Guiscard, duke of Puglia and Calabria, was making great preparations against him in the West.

To this expedition, Robert was incited by Michael Ducas. That prince had been deposed by Nicephoru Botoniates, and towards the end of the usurper's reign fled into the West, where he was received by Robert, who was prevailed upon to favour his cause. For this purpose, Robert made great preparations; and these were continued even after the depopulation of Botoniates. He failed with all his forces from Brundisium; and landing at *Bubretum* in Epirus, made himself master of that place, while his son Bohemond with part of the army reduced Anlon, a celebrated port and city in the country now called *Albania*. From thence they advanced to Dyrrhachium, which

Constantinopolitan history.

137 They conquer several provinces.

138 Alexius Comnenus stops their progress.

139 Robert Guiscard's expedition against the emperor.

140 He passes over into Epirus and besieges Dyrrhachium.

Constanti-
nopolitan
history.

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nopolitan
history.

they invested both by sea and land; but met with a most vigorous opposition from George Paleologus, whom the emperor had entrusted with the defence of that important place. In spite of the utmost efforts of the enemy, this commander held out till the arrival of the Venetian fleet, by whom Robert's navy commanded by Bohemond was utterly defeated, the admiral himself having narrowly escaped being taken prisoner. After this victory, the Venetians landed without loss of time, and being joined by Paleologus's men, fell upon Robert's troops with such fury, that they destroyed their works, burnt their engines, and forced them back to their camp in great disorder. As the Venetians were now masters at sea, the besieged were supplied with plenty of provisions, while a famine began to rage in the camp of the enemy; and this calamity was soon followed by a plague, which in the space of three months is said to have destroyed ten thousand men. Notwithstanding all these disasters, however, Robert did not abandon the siege: having found means to supply his famished troops with provisions, he continued it with such vigour, that the courage of the besieged began at last to fail them; and Paleologus sent repeated messages to the emperor, acquainting him that he would be obliged to surrender unless very speedily assisted. On this Alexius marched in person to the relief of the city, but was defeated with great loss by Robert. The whole right wing of Alexius's army, finding themselves hard pressed by the enemy, fled to a church dedicated to St Michael, imagining they would there find themselves in a place of safety; but the victorious army pursuing them, set fire to the church, which was burnt to ashes with all who were in it. The emperor himself with great difficulty made his escape, leaving the enemy masters of his camp and all his baggage. Soon after this defeat, the city surrendered; and Alexius being destitute of resources for carrying on the war, seized on the wealth of churches and monasteries, which gave much offence to the clergy, and had like to have occasioned great disturbances in the Imperial city. At the same time, Alexius entering into an alliance with Henry emperor of Germany, persuaded him to invade the dominions of Robert in Italy. At first, Henry met with great success; but was soon overcome, and driven out of that country by Robert. Bohemond, in the mean time, reduced several places in Illyricum; and, having defeated Alexius in two pitched battles, entered Thessaly, and sat down before Larissa. This place, being defended by an officer of great courage and experience in war, held out till the emperor came to its relief. Soon after his arrival, he found means to draw a strong party of Bohemond's men into an ambuscade, and cut them off almost entirely. However, in the battle which was fought a few days after, Bohemond had the advantage; but his troops mutinying and refusing to carry on the war, he was obliged to return to Italy. Alexius taking advantage of his absence, recovered several cities; and being informed that Robert was making great preparations against him, he had recourse once more to the Venetians. By them he was assisted with a powerful fleet, which defeated that of Robert in two engagements; but being soon after surprised by him,

they were defeated with the loss of almost their whole navy. Robert is said to have used his victory with great barbarity, putting many of his prisoners to death with unheard-of torments. The Venetians equipped a second fleet; and joining that of the emperor, fell unexpectedly upon Robert's navy, who were riding without the least apprehension in Buthrotum, sunk most of his ships, and took a great number of prisoners, his wife and younger sons having narrowly escaped falling into their hands. Robert made great preparations to revenge this defeat; but was prevented by death from executing his designs; and, after his decease, his son Roger did not think proper to pursue so dangerous and expensive a war. He therefore recalled his troops, and the places which had been conquered by Robert and Bohemond submitted a-new to the emperor.

This war was scarce ended, when the Scythians passing the Danube, laid waste great part of Thrace, committing every where the greatest barbarities. Against them the emperor dispatched an army under the command of Pacurianus and Brianas. The latter insisted upon engaging the enemy contrary to the opinion of his colleague; and his rashness caused the loss of the greater part of the army, who were cut off by the Scythians, together with the two generals. *Talicius*, an officer who had signalized himself on many occasions, was appointed to command the army in their room. He fell upon the enemy as they lay securely in the neighbourhood of Philippopolis, cut great numbers of them in pieces, and obliged the rest to retire in great confusion. The following spring, however, they returned in such numbers, that the emperor resolved to march against them in person. Accordingly he set out for Adrianople, and from thence to a place called *Lardea*. Here, contrary to the advice of his best officers, he ventured a battle; in which he was utterly defeated with the loss of vast numbers of his men, he himself escaping with the utmost difficulty. The next year he was attended with no better success, his army being entirely defeated, with the loss of his camp and baggage. In the year following, 1084, the emperor retrieved his credit; and gave the Scythians such an overthrow, that very few escaped the general slaughter. Notwithstanding this disaster, however, they again invaded the empire in 1093. To this they were encouraged by an impostor called *Leo*, who pretended to be the eldest son of Romanus Diogenes. The young Prince had been slain in a battle with the Turks; but as the Scythians only wanted a pretence to renew the war, they received the impostor with joy. By a stratagem, however, *Leo* was murdered; and the Scythians being afterwards overthrown in two great battles, were obliged to submit on the emperor's own terms.

Since the year 1083, the war had been carried on with the Turks with various success; but now an association was formed in the West against these infidels, which threatened the utter ruin of the Turkish nation. This was occasioned by the superstition of the Christians, who thought it a meritorious action to venture their lives for the recovery of the Holy Land, possessed at that time by the Turks and Saracens. Had the western princes been properly assisted by the emperors

142
The war
ended by
the death
of Robert.

143
The Scy-
thian war.

144
The Ro-
mans de-
feated.

145
They at
last defeat
the Scy-
thians.

146
The Holy
War.

141
The city
surrenders.

Constantinople history.

rors of the East in this undertaking, the Turks had undoubtedly been unable to resist them; but so far from this, the Latins were looked upon by them as no less enemies than the Turks: and indeed whatever places they took from the infidels, they never thought of restoring to the emperors of Constantinople, to whom they originally belonged, but erected a number of small independent principalities; which neither having sufficient strength to defend themselves, nor being properly supported by one another, soon became a prey to the Turks. But as these transactions naturally fall to be considered under the History of the *Turks*, we refer to that article for a particular account of them. Here we shall only take notice of the taking of Constantinople by the Latins: an event of such importance as cannot be passed over in silence. The occasion of this revolution was as follows. In the year 1203, happened a dreadful fire at Constantinople, occasioned by some Latin soldiers. These had plundered a mosque, which the Turks residing in Constantinople had been suffered to build there. For this reason they were attacked by the infidels; who being much superior to them in number, the Latins found themselves obliged to set fire to some houses, in order to make their escape with safety. The flame spreading in an instant from street to street, reduced in a short time great part of the city to ashes, with the capacious store-houses which had been built at a vast expence on the quay. The late emperor Isaac Angelus, who had been restored to his throne by the Latins, died soon after their departure from Constantinople, leaving his son Alexius sole master of the empire. The young prince, to discharge the large sums he had promised to the French and Venetians for their assistance, was obliged to lay heavy taxes on his subjects; and this, with the great esteem and friendship shewed to his deliverers, raised a general discontent among the people of Constantinople, who were sworn-enemies to the Latins. This encouraged John Ducas, surnamed *Murtzuphlus*, from his joined and thick eye-brows, to attempt the sovereignty. Unhappily he found means to put his treacherous designs in execution; and strangled the young prince with his own hands. After this he presented himself to the people; told them what he had done, which he pretended was in order to secure their liberties; and earnestly entreated them to choose an emperor who had courage enough to defend them against the Latins that were ready to oppress and enslave them. On this he was instantly saluted emperor by the inconstant multitude; but this usurpation proved the ruin of the city. The Latins immediately resolved to revenge the death of the young prince; and, as they had been so often betrayed and retarded in their expeditions to the Holy Land by the emperors of Constantinople, to make themselves masters of that city, and seize the empire for themselves. In consequence of this resolution they mustered all their forces in Asia, and having crossed the streights, laid siege to Constantinople by sea and land. The tyrant, who was a man of great courage and experience in war, made a vigorous defence. The Latins, however, after having battered the walls for several days together with an incredible number of engines, gave a general assault on the 8th of April 1204. The attack lasted from

147
Dreadful
fire at Con-
stantinople.148
Murtzuphlus strangles the emperor.

break of day till three in the afternoon, when they were forced to retire, after having lost some of their engines, and a great number of men. The assault was nevertheless renewed four days after; when, after a warm dispute, the French planted their standard on one of the towers; which the Venetians observing, they quickly made themselves masters of four other towers, where they likewise displayed their ensigns. In the mean time three of the gates being broke down by the battering rams, and those who had scaled the walls having killed the guards, and opened the gates between the towers they had taken, the whole army entered, and drew up in battle array between the walls. The Greeks fled up and down in the greatest confusion; and several parties were by the Latins dispatched to scour the streets, who put all they met to the sword, without distinction of age or condition. Night put a stop to the dreadful slaughter, when the princes founding the retreat, placed their men in different quarters of the city, with orders to be upon their guard, not doubting but they should be attacked early next morning. They were surprised, however, at that time by the entire submission of the Greeks; to whom they promised their lives, but at the same time, ordering them to retire to their houses, they gave up the city to be plundered by the soldiers for that day. They strictly enjoined their men to abstain from slaughter, to preserve the honour of the women, and to bring the whole booty into one place, that a just distribution might be made according to the rank and merit of each individual. The Greeks had undoubtedly concealed their most valuable effects during the night; many persons of the first rank had escaped, and carried along with them immense treasures; the soldiers had probably, as is usual in all such cases, reserved things of great value for themselves, notwithstanding all prohibitions to the contrary; and yet the booty, without the statues, pictures, and jewels, amounted to a sum almost incredible. As for Murtzuphlus, he made his escape in the night; embarking on a small vessel with *Euphrosyne*, the wife of *Alexius Angelus* a late usurper, and her daughter *Eudoxia*, for whose sake he had abandoned his lawful wife.

Constantinople continued subject to the Latins till the year 1261, when they were expelled by *Alexius Strategopulus*. He was a person of an illustrious family; and, for his eminent services, distinguished with the title of *Cæsar*. He had been sent against Alexius Angelus despot of Epirus, who now attempted to recover some places in Thessaly and Greece from Michael Paleologus, one of the Greek emperors, that, since the capture of Constantinople, had kept their court at Nice; and to try whether he could on his march surprise the imperial city itself. Alexius, having passed the streights, encamped at a place called *Rhégium*, where he was informed by the natives that a strong body of the Latins had been sent to the siege of *Daphnusa*, that the garrison was in great want of provisions, and that it would be no difficult matter to surprise the city. Hereupon the Greek general resolved at all events to attempt it; in which he was encouraged by some of the inhabitants, who, coming privately to his camp, offered themselves to be his guides. He approached the walls in the dead of the night,

Constantinople history.

149
The city taken and plundered by the Latins.150
The Latins expelled.

which

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which some of his men sealed without being observed ; and, killing the centries whom they found asleep, opened one of the gates to the rest of the army. The Greeks rushing in, put all they met to the sword ; and at the same time, to create more terror, set fire to the city in four different places. The Latins, concluding from thence that the enemy's forces were far more numerous than they really were, did not so much as attempt either to drive them out, or to extinguish the flames. In this general confusion the emperor Baldwin, quitting the enigmis of majesty, fled with Justinian the Latin patriarch, and some of his intimate friends, to the sea-side ; and there, embarking on a small vessel, sailed first to Eubœa, and afterwards to Venice, leaving the Greeks in full possession of Constantinople. When news of this surprising and altogether unexpected success of Alexius were first brought to Paleologus, he could scarce give credit to it ; but receiving soon after letters from Alexius himself, with a particular account of so memorable an event, he ordered public thanks to be returned in all the churches, appeared in public in his imperial robes, attended by the nobility in their best apparel, and ordered couriers to be dispatched with the agreeable news into all parts of the empire.

151
Entry of
Michael
Paleologus
into the
city.

Soon after, having settled his affairs at Nice, he set out for Constantinople with the empress, his son Andronicus, the senate, and nobility, to take possession of the imperial city, and fix his residence in that place that had originally been designed for the seat of the eastern empire. Having passed the freights, he advanced to the *golden gate*, and continued some days without the walls, while the citizens were busied in making the necessary preparations to receive him with a magnificence suitable to the occasion. On the day appointed, the golden gate, which had been long shut up, was opened, and the emperor entering it amidst the repeated acclamations of the multitude, marched on foot to the great palace. He was preceded by the bishop of *Cyzicus*, who carried an image of the Virgin Mary, supposed to have been done by St Luke, and followed by all the great officers, nobility, and chief citizens, pompously dressed. Public thanks were again returned in the church of St Sophia, at which the emperor assisted in person, with the clergy, the senate, and nobility. These exercises were succeeded by all sorts of rejoicings ; after which the emperor carefully surveyed the imperial city. This survey greatly alleviated his joy. He saw the stately palaces and other magnificent buildings of the Roman emperors lying in ruins ; the many capacious buildings that had been erected by his predecessors, at an immense charge, destroyed by fire, and other unavoidable accidents of war ; several streets abandoned by the inhabitants, and choked up with rubbish, &c. These objects gave the emperor no small concern, and kindled in him a desire of restoring the city to its former lustre. In the mean time, looking upon Alexius as the restorer of his country, he caused him to be clad in magnificent robes ; placed with his own hand a crown on his head ; ordered him to be conducted through the city, as it were in triumph ; decreed that for a whole year the name of Alexius should be joined in the public prayers with his own ; and, to perpetuate the memory of so great and glorious an action, he commanded his statue to be

152
He resolves
to restore
it to its former grandeur.

erected on a stately pillar of marble before the church of the Apollides. His next care was to re-people the city, many Greek families having withdrawn from it while it was held by the Latins, and the Latins now preparing to return to their respective countries. The former were recalled home ; and the latter, in regard of the great trade they carried on, were allowed many valuable privileges, which induced them not to remove. The Greeks were allowed to live in one of the most beautiful quarters of the city, to be governed by their own laws and magistrates, and to trade without paying customs or taxes of any kind. Great privileges were likewise granted to the natives of Venice and Pisa, which encouraged them to lay aside all thoughts of removing, and the trade they carried on proved afterwards highly advantageous to the state.

It was not long, however, before these regulations were altered. The emperor being soon after informed that Baldwin, lately expelled from Constantinople, had married his daughter to Charles king of Sicily, and given him, by way of dowry, the imperial city itself, he ordered the Genoese, who were become very numerous, to remove first to Heraclea, and afterwards to Galata, where they continued. As for the Pisans and Venetians, who were not so numerous and wealthy, they were allowed to continue in the city. Paleologus, though he had caused himself to be proclaimed emperor, and was possessed of absolute sovereignty, was as yet only guardian to the young emperor John Lascaris, then about 12 years of age. But having now settled the state, and having gained the affections both of natives and foreigners, he began to think of securing himself and his posterity in the full enjoyment of the empire ; and for this reason cruelly ordered the eyes of the young prince to be put out, pretending that none but himself had any right to the city or empire of Constantinople, which he alone had recovered out of the hand of the Latins.

This piece of treachery and in humanity involved him in great troubles. The patriarch immediately excommunicated him ; and he would in all probability have been driven from the throne by a combination of the western princes, had he not engaged pope Urban IV. to espouse his cause, by promising to submit himself and his dominions to the Latin church. Thus, indeed, he diverted the present storm ; but this proceeding caused the greatest disturbances, not only in Constantinople, but throughout the whole empire, nor was Paleologus able to reconcile his subjects to this union.

In 1283 Michael died, and was succeeded by his son Andronicus. His first step was to restore the ancient Greek ceremonies, thinking he could not begin his reign with a more popular act. But thus he involved himself in difficulties still greater than before. Though Michael had not been able fully to reconcile his Greek subjects to the Latin ceremonies, yet he had in some degree accomplished his purpose. The Latins had got a considerable footing in the city, and defended their ceremonies with great obstinacy ; so that the empire was again thrown into a ferment by this imprudent step.

All this time the Turks had been continuing their encroachments on the empire, which, had it not been for the crusades published against them by the Pope, they

Constantinopolitan history.

153
Great disturbances occasioned by the treachery of Paleologus.

154
Union of the Greek and Latin churches.

155
Dissolved.

156
War with the Turks.

Constantinopolitan history.

they would in all probability have made themselves matters of before this time. They were now, however, very successfully opposed by Constantine the emperor's brother : but his valour rendered him suspected by the emperor; in consequence of which he was thrown into prison, along with several persons of great distinction. On the removal of this brave commander, the Turks, under the famous Othoman, made themselves masters of several places in Phrygia, Caria, and Bithynia; and, among the rest, of the city of Nice. To put a stop to their conquests, the emperor dispatched against them Philanthropus and Libadarius, two officers of great experience in war. The former gained some advantages over the enemy; but being elated with his success, caused himself to be proclaimed emperor. This rebellion, however, was soon suppressed, Philanthropus being betrayed by his own men: but the Turks taking advantage of these intestine commotions, not only extended their dominions in Asia, but conquered most of the islands in the Mediterranean; and, being masters at sea, infested the coasts of the empire, to the utter ruin of trade and commerce.

From this time the Roman empire tended fast to dissolution. After the revolt of Philanthropus, the emperor could no longer trust his subjects, and therefore hired the Massagets to assist him: but they, behaving in a careless manner, were first defeated by their enemies, and afterwards turned their arms against those they came to assist. He next applied to the Catalans, who behaved in the same manner; and having ravaged the few places left the emperor in Asia, returned into Europe, and called the Turks to their assistance.

This happened in the year 1292, and was the first appearance of the Turks in Europe. This enterprise, however, was unsuccessful. Having loaded themselves with booty, they offered to depart quietly if they were allowed a safe passage, and ships to transport them to Asia. To this the emperor, willing to get rid of such troublesome guests, readily consented, and ordered the vessels to be got ready with all possible expedition. But the Greek officers observing the immense booty with which they were loaded, resolved to fall upon them in the night, and cut them all off at once. This scheme, however, was not managed with such secrecy but that the Turks had notice of it, and therefore prepared for their defence. They first surprised a strong castle in the neighbourhood, and then found means to acquaint their countrymen in Asia with their dangerous situation. Their brethren, enticed with the hopes of booty, were not long of coming to their assistance; and having crossed the Hellespont in great numbers, ravaged the adjacent country, making excursions to the very gates of Constantinople. At last the emperor determined to root them out; and accordingly marched against them with all his forces, the country people flocking to him from all quarters. The Turks at first gave themselves over for lost; but finding the Greeks negligent of discipline, they attacked their army unexpectedly, utterly defeated it, and made themselves masters of the camp. After this unexpected victory, they continued for two years to ravage Thrace in the most terrible manner. At last, however, they

were defeated; and being afterwards shut up in the Chersonesus, they were all cut in pieces, or taken.

Soon after new commotions took place in this unhappy empire, of which the Turks did not fail to take the advantage. In 1327 they made themselves masters of most of the cities on the Mæander; and, among the rest, of the strong and important city of Prusa in Bithynia. The next year, however, Othoman, who may justly be styled the founder of the Turkish monarchy, being dead, the emperor laid hold of that opportunity to recover Nice, and some other important places, from the infidels. But these were lost the year following, together with Abydus and Nicomedia; and in 1330 a peace was concluded upon condition that they should keep all their conquests. This peace they observed no longer than served their own purposes; for new commotions breaking out in the empire, they pursued their conquests, and by the year 1357 had reduced all Asia. They next passed the Hellespont under the conduct of Solymán the son, or, as others will have it, the brother of Orchanes, the successor of Othoman, and seized on a strong castle on the European side. Soon after, the Turkish sultan died, and was succeeded by Amurath. He extended the conquests of his predecessors, and in a short time reduced all Thrace, making Adrianople the seat of his empire. Amurath was slain by treachery in a little time after, and was succeeded by his son Bajazet. This prince greatly enlarged his dominions by new conquests. In a short time he reduced the countries of Thessaly, Macedonia, Phocis, Peloponnesus, Mysia, and Bulgaria, driving out the despots or petty princes who ruled there. Elated with his frequent victories, he began to look upon the Greek emperor, to whom nothing was now left but the city of Constantinople and the neighbouring country, as his vassal. Accordingly he sent him an arrogant and haughty message, commanding him to pay a yearly tribute, and send his son Manuel to attend him in his military expeditions. This demand the emperor was obliged to comply with, but died soon after in the year 1392.

Manuel no sooner heard of his father's death than he hastened to Constantinople, without taking leave of the sultan, or acquainting him with the reasons of his sudden departure. At this Bajazet was so highly offended, that he passed with great expedition out of Bithynia into Thrace, ravaged the country adjoining to Constantinople, and at last invested the city itself both by sea and land. In this extremity Manuel had recourse to the western princes; who sent him an army of 130,000 men, under the command of Sigismund king of Hungary, and John count of Nevers. But though the western troops proved at first successful, they were in the end defeated with great slaughter by Bajazet, who then returned to the siege with greater vigour than ever. As he found, however, that the citizens were determined to hold out to the last, he applied to John, the son of Manuel's elder brother, who had a better title to the crown than Manuel himself. With him he entered into a private agreement, by virtue of which Bajazet was to place John upon the throne of Constantinople; on the other hand, John was to deliver up the city to the Turks, and remove the imperial seat to Peloponnesus, which

Constantinopolitan history.

159
Adrianople taken by the Turks.

160
Bajazet besieges Constantinople.

157
their first appearance in Europe.

158
they are cut in pieces, or taken.

the

Constanti-
nopolitan
history.

the sultan promised to relinquish to him and his posterity. At the same time he sent deputies to the inhabitants of Constantinople, offering to withdraw his army, and cease from further hostilities, provided they expelled Manuel and placed John upon the throne. This proposal rent the city into two factions; but Manuel prevented the mischief which were ready to ensue, by a voluntary resignation, upon condition that he should be allowed to retire to whatever place he thought proper with his wife and children.

With this condition John readily complied; and Manuel having received him into the city, and conducted him to the palace, set sail for Venice. From thence he went to the courts of all the western princes, to solicit their assistance against the Turks, whose power was grown formidable to all Europe. He was every where received with the greatest demonstrations of esteem, and promised large supplies; all Christendom being now alarmed at the progress of the infidels.

In the mean time Bajazet did not fail to put John in mind of his promise; but the citizens refusing to comply with such a scandalous treaty, the siege was renewed, and the city assaulted with more fury than ever. When it was already reduced to the last extremity, news were brought the sultan that Tamerlane, the victorious Tartar, having over-run all the East with incredible celerity, had now turned his arms against the Turks, and was preparing to break into Syria. Bajazet alarmed at the danger that threatened him, raised the siege in great haste, and advanced against Tamerlane with a very numerous and well-disciplined army; but the Tartar totally defeated and took him prisoner, after having cut most of his men in pieces; and thus Constantinople was preserved for the present.

But this relief was of short duration. In 1424 the city was again besieged by Amurath II. The inhabitants defended themselves with great bravery; but must in the end have submitted, had not the emperor prevailed upon the prince of Caramania to countenance an impostor and pretender to the Turkish throne. This obliged Amurath to raise the siege, and march with all his forces against the usurper, whom he soon reduced. Having then no other enemies to contend with, he entered Macedon at the head of a powerful army; and having ravaged the country far and near, he took and plundered Thessalonica, as he did also most of the cities of Ætolia, Phocis, and Bœotia. From Greece he marched into Servia; which country he soon reduced. He next broke into the dominions of the king of Hungary, and besieged the strong city of Belgrade; but here he met with a vigorous repulse, no fewer than 15,000 Turks being slain by the Christians in one fall, which obliged the sultan to drop the enterprize and retire.

In his retreat he was attacked by the celebrated John Hunniades, who cut great numbers of his men in pieces, and obliged the rest to fly with precipitation. Not long after he gained a still more complete victory over the enemy in the plains of Transylvania, with the loss of only 3000 of his own men, whereas 20,000 of the Turks were killed on the field of battle, and almost an equal number in the pursuit. Amurath,

who was then at Adrianople, sent an army into Transylvania far more numerous than the former; but they were attended with no better success, being cut off almost to a man by the brave Hungarian. He gained several other victories no less remarkable; but was at last entirely defeated in 1448; and with this defeat ended all hopes of preserving the Roman empire. The unhappy emperor was now obliged to pay an annual tribute of 300,000 aspers to the sultan; and to yield up to him some strong holds which he still held on the Euxine sea. However, as he doubted not but Amurath would soon attempt to become master of the city itself, he renewed the union between the Greek and Latin churches, hoping that this would induce the western princes to assist him in the defence of the city against the Turks. This union produced great disturbances, which the emperor did not long survive, but died in 1448, leaving the empire, now confined within the walls of Constantinople, to his brother Constantine.

Amurath the Turkish sultan died in 1450, and was succeeded by his son Mohammed. In the beginning of his reign he entered into an alliance with Constantine, and pretended a great desire to live in friendship with him and the other Christian princes; but no sooner had he put an end to a war in which he was engaged with Ibrahim king of Caramania, than he built a strong fort on the European side of the Bosphorus, opposite to another in Asia; in both of which he placed strong garrisons. These two castles commanded the Straits; and the former being but five miles from the city, kept it in a manner blocked up. This soon produced a misunderstanding between him and the emperor, which ended in the siege of the city. The siege commenced on the sixth of April 1453. Mohammed's numerous forces covering the plains before it on the land-side, and a fleet of 300 sail blocking it up by sea. The emperor, however, had taken care to secure the haven, in which were three large ships, 20 small ones, and a great number of galleys, by means of a chain drawn across the entrance. Mohammed began the siege by planting batteries as near the city as he could, and raising mounds in several places as high as the walls themselves, whence the besieged were incessantly galled with showers of arrows. He had in his camp a piece of ordnance of prodigious size, which is said to have carried a ball of 100 pounds weight made of hard black stone brought from the Euxine sea. With this vast piece the enemy made several breaches in the walls; which, however, were repaired with incredible expedition by the besieged. But Mohammed, the better to carry on the siege, caused new levies to be made throughout his extensive dominions, by which his army was soon increased to near 400,000 men, while the garrison consisted only of 9000 regular troops, viz. 6000 Greeks and 3000 Genoese and Venetians. As the enemy continued to batter the walls day and night without intermission, a great part of them was at last beaten down; but while the Turks were busy in filling up the ditch, in order to give the assault, a new wall was built. This threw the tyrant into a prodigious rage, which was greatly heightened when he saw his whole fleet worsted by five ships, four of

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nopolitan
history.

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He is at last
defeated.

161
He is de-
feated and
taken prisoner
by Tamerlane.

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Amurath
besieges
Constanti-
nople.

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The siege
raised.

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Success of
John Hun-
niades against
the
Turks.

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nople be-
sieged by Mo-
hammed.

which

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nopolitan
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He conveys
30 galleys
over land
into the har-
bour.

which were laden with corn from Peloponnesus, and the others with all manner of provisions from the Isle of Chios. These opened themselves a way through the whole Turkish fleet; and, to the inexpressible joy of the Christians, at last got safe into the harbour.

The Turks attempted several times to force the haven; but all their efforts proving ineffectual, Mohammed formed a design of conveying 80 galleys over land for the space of eight miles into it. This he accomplished by means of certain engines, the contrivance of a renegade; and having then either taken or sunk all the ships contained in it, he caused a bridge to be built over it with surprising expedition. By this means the city was laid open to an assault from that side likewise. The place was now assaulted on all sides; and Constantine being well apprised that he could not long hold out against such a mighty fleet and so numerous an army, sent deputies to Mohammed, offering to acknowledge himself his vassal, by paying him yearly what tribute he should think proper to impose, provided he raised the siege and withdrew. The tyrant answered that he was determined at all events to become master of the city: but if the emperor delivered it up forthwith, he would yield up to him Peloponnesus, and other provinces to his brothers, which they should enjoy peaceably as his friends and allies; but if he held out to the last extremity, and suffered it to be taken by assault, he would put him and the whole nobility to the sword, abandon the city to be plundered by his soldiers, and carry the inhabitants into captivity.

This condition was rashly rejected by the emperor; who thereby involved himself and all his subjects in the most terrible calamity. The siege was renewed with more vigour than ever, and continued till the 25th of May, when a report being spread in the Turkish camp, that a mighty army was advancing in full march to the relief of the city, under the conduct of the celebrated John Hunniades, the common soldiers, seized with a panic, began to mutiny, and press Mohammed in a tumultuous manner to break up the siege. Nay, they openly threatened him with death, if he did not immediately abandon the enterprize and retire from before the city, which they despaired of being able to reduce before the arrival of the supposed succours. Mohammed was upon the point of complying with their demand, when he was advised by Zagan, a Turkish officer of great intrepidity, and an irreconcilable enemy to the Christian name, to give without loss of time a general assault. To this he said the soldiery, however mutinous, would not be averse, provided the sultan solemnly promised to abandon the city to be plundered by them. As such an advice best suited the humour of Mohammed, he readily embraced it, and caused a proclamation to be published throughout the camp, declaring, that he gave up to his soldiers all the wealth of that opulent city, requiring for himself only the empty houses.

The desire of plunder soon got the better of that fear which had seized the Turkish army; and they unanimously desired to be led on to the attack. Hereupon Constantine was summoned for the last time to deliver up the city, - with a promise of his life and li-

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berty: but to this he answered, that he was unalterably determined either to defend the city or to perish with it. The attack began at three in the morning on Tuesday the 29th of May; such troops were first employed as the sultan valued least, and designed them for no other purpose than to tire the Christians, who made a prodigious havock of that disorderly multitude. After the carnage had lasted some hours, the Janizaries and other fresh troops advanced in good order, and renewed the attack with incredible vigour. The Christians, summoning all their courage and resolution, twice repelled the enemy: but being in the end quite spent, they were no longer able to stand their ground; so that the enemy in several places broke into the city. In the mean time Justiniani, the commander of the Genoese and a select body of Greeks, having received two wounds, one in the thigh and the other in the hand, was so disheartened, that he caused himself to be conveyed to Galata, where he soon after died of grief. His men, dismayed at the sudden flight of their general, immediately quitted their posts and fled in the utmost confusion. However, the emperor, attended by a few of the most resolute among the nobility, still kept his post, striving with unparalleled resolution to oppose the multitude of barbarians that now broke in from every quarter. But being in the end overpowered with numbers, and seeing all his friends lie dead on the ground, "What! (cried he aloud), is there no Christian left alive to strike off my head?" He had scarce uttered these words, when one of the enemy, not knowing him, gave him a deep cut across the face with his sabre; and at the same time, another coming behind him, with a blow on the back part of his head, laid him dead on the ground. After the death of the emperor, the few Christians that were left alive betook themselves to flight; and the Turks, meeting with no further opposition, entered the city, which they filled with blood and slaughter. They gave no quarter, but put all they met to the sword, without distinction. Many thousands took refuge in the church of St Sophia; but they were all massacred in their asylum by the enraged barbarians, who, prompted by their natural cruelty, the desire of revenge, and love of booty, spared no place nor person. Most of the nobility were, by the sultan's orders, cut off, and the rest kept for purposes more grievous than death itself. Many of the inhabitants, among whom were some men of great learning, found means to make their escape, while the Turks were busied in plundering the city. These embarking on five ships then in the harbour, arrived safe in Italy; where, with the study of the Greek tongue, they revived the liberal sciences, which had long been neglected in the West. After the expiration of three days, Mohammed commanded his soldiers to forbear all further hostilities on pain of death; and then put an end to as cruel a pillage and massacre as any mentioned in history. The next day he made his public and triumphal entry into Constantinople, and chose it for the seat of the Turkish empire, which it has continued to be ever since.

This city is now called by the Turks *Istampol*, and by the Greeks *Istampoli* or *Stampoli*. It is seated at the eastern extremity of Romania, on a small neck of

Constanti-
nopolitan
history.

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A general
assault gi-
ven.

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Bravery of
the emper-
or.

171
He is kil-
led.

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The town
plundered,
and the in-
habitants
massacred.

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Present
state of the
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13 D

land,

Constan-
tinopolitan
history
Constella-
tion.

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tion
Constella-
tion.

land, which advances towards Natolia, from which it is separated by a channel of a mile in breadth. The sea of Marmora washes its walls on the south, and a gulph of the channel of Constantinople does the same on the north. It is delightfully situated between the Black-sea and the Archipelago, from whence it is supplied with all necessities. The grand Seigneur's palace, called the Seraglio, is seated on the sea-side, and is surrounded with walls flanked with towers, and separated from the city by canals. It is said the harbour will easily hold 1200 ships. The number of houses must needs be prodigious, since one fire has burnt down 30,000 in a day, without greatly changing the aspect of the city. However, in general, they are but mean, especially on the out-side, where there are few or no windows, and the streets being narrow, gives them a melancholy look. They reckon that there are 3770 streets, small and great: but they are seldom or never clean; and the people are infected with the plague almost every year. The inhabitants are half Turks, two thirds of the other half Christians, and the rest Jews. Here are a great number of ancient monuments still remaining, and particularly the superb temple of Sophia, which is turned into a mosque, and far surpasses all the rest. The street called Adrianople, is the longest and broadest in the city; and the bazars, or bezeiteins, are the markets for selling all sorts of merchandize. The old and the new are pretty near each other; and are large square buildings, covered with domes, and supported by arches and pilasters. The new is the best, and contains all sorts of goods, which are there exposed to sale. The market for slaves, of both sexes, is not far off; and the Jews are the principal merchants, who bring them here to be sold. There are a great number of young girls brought from Hungary, Greece, Candia, Russia, Mingrelia, and Georgia, for the service of the Turks, who generally buy them for their seraglios. The great square, near the mosque of Sultan Bajazet, is the place for public diversions, where the jugglers and mountebanks play a great variety of tricks. The circumference of this city is by some said to be 15 miles, and by Mr Tournesfort 23 miles; to which, if we add the suburbs, it may be 34 miles in compass. The suburb called Pera, is charmingly situated; and is the place where the ambassadors of England, France, Venice, and Holland, reside. This city is built in the form of a triangle; and as the ground rises gradually, there is a view of the whole town from the sea. The public buildings, such as the palaces, the mosques, bagnios, and caravansaries for the entertainment of strangers, are many of them very magnificent. E. Long. 29. 20. N. Lat. 41. 4.

CONSTELLATION, in astronomy, a system of several stars that are seen in the heavens, near to one another. Astronomers not only mark out the stars, but, that they may better bring them into order, they distinguish them by their situation and position in respect to each other; and therefore they distribute them into asterisms, or constellations, allowing several

stars to make up one constellation: and for the better distinguishing and observing them, they reduce the constellations to the forms of animals, as men, bulls, bears, &c. or to the images of some things known, as of a crown, a harp, a balance, &c.; or give them the names of those whose memories, in consideration of some notable exploit, they had a mind to transmit to future ages.

The division of the stars by images and figures is of great antiquity, and seems to be as old as astronomy itself: for in the most ancient book of Job, Orion, Arcturus, and the Pleiades, are mentioned; and we meet with the names of many of the constellations in the writings of the first poets, Homer and Hesiod.

The ancients, in their division of the firmament, took in only so much as came under their notice, distributing it into 48 constellations; but the modern astronomers comprehend the whole starry firmament, dividing it into three regions. See *АСТРОНОМІЯ*, n^o 203, &c.

CONSTIPATION, in medicine, a hardness of the belly, with great costiveness. See *COSTIVENESS*.

CONSTITUENT PART, in physiology, an essential part in the composition of any thing, differing little from what is otherwise called *element* or *principle*.

CONSTITUTION, in matters of policy, signifies the form of government established in any country or kingdom.

CONSTITUTION also denotes an ordinance, decision, regulation, or law, made by authority of any superior, ecclesiastical or civil.

Apollitical CONSTITUTIONS, a collection of regulations attributed to the apostles, and supposed to have been collected by St Clement, whose name they likewise bear.

It is the general opinion, however, that they are spurious, and that St Clement had no hand in them. They appeared first in the IVth age, but have been much changed and corrupted since that time. They are divided into eight books, consisting of a great number of rules and precepts, relating to the duties of Christians, and particularly the ceremonies and discipline of the church. Mr Whiston, in opposition to the general opinion, asserts them to be a part of the sacred writings, dictated by the apostles in their meetings, and wrote down from their own mouth by St Clement; and intended as a supplement to the New Testament, or rather as a system of Christian faith and polity. The reason why the Constitutions are suspected by the orthodox, and perhaps the reason also why their genuineness is defended by Mr Whiston, is, that they seem to favour Arianism.

CONSTITUTION, in a physical sense, signifies the particular temperature of the body.

It is curious to observe, says Dr Percival, the revolution which hath taken place, within this century, in the constitutions of the inhabitants of Europe. Inflammatory diseases more rarely occur, and, in general, are much less rapid and violent in their progress than formerly*, nor do they admit of the same antiphlogistic method

* The decrease in the violence of inflammatory diseases may perhaps in part be ascribed to the present improved method of treating them. Moderate evacuations, cool air, astringent diet, and the liberal use of saline and antimonial medicines, are better adapted to check the progress of fevers, than copious bleedings, stimulating purgatives, and profuse sweats, excited by iacacia and mithridate.

Constitution
↑
Construction.

method of cure that was practised with success 100 years ago. The experienced Sydenham makes 40 ounces of blood the mean quantity to be drawn in the acute rheumatism; whereas this disease, as it now appears in the London hospitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without venesection; which is a proof that at present they are accompanied with fewer symptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous class of nervous ailments, in a great measure unknown to our ancestors; but which now prevail universally, and are complicated with almost every other distemper. The bodies of men are enfeebled and enervated; and it is not uncommon to observe very high degrees of irritability, under the external appearance of great strength and robustness. The hypochondria, palfies, cachexies, dropsies, and all those diseases which arise from laxity and debility, are in our days endemic every where; and the hysterics, which used to be peculiar to the women, as the name itself indicates, now attack both sexes indiscriminately. It is evident that so great a revolution could not be effected without a concurrence of many causes; but amongst these, (according to Dr Percival), the present general use of tea* holds the first and principal rank. The second place may perhaps be allowed to excess in spirituous liquors. This pernicious custom, in many instances at least, owes its rise to the former, which, by the lowness and depression of spirits it occasions, renders it almost necessary to have recourse to something cordial and exhilarating. And hence proceed those odious and disgraceful habits of intemperance, with which many of the softer sex are now, alas! chargeable.

CONSTRUCTOR, an appellation given to several muscles, on account of their constringing or closing some of the orifices of the body.

CONSTRUCTION, in geometry, is the drawing such lines, such a figure, &c. as are previously necessary for making any demonstration appear more plain and undeniable.

CONSTRUCTION of Equations. See **EQUATIONS**.

CONSTRUCTION, in grammar; syntax, or the arranging and connecting the words of a sentence according to the rules of the language. See **GRAMMAR**, and **LANGUAGE**.

The construction is generally more simple, easy, and direct, in the modern tongues than in the ancient: we have very few of those inversions which occasion so much embarrassment and obscurity in the Latin; our thoughts are usually delivered in the same order wherein the imagination conceives them: the nominative case, for instance, always precedes the verb, and the verb goes before the oblique cases it governs.

The Greeks and Latins, M. St Evremont observes, usually end their periods, where, in good sense and reason, they should have begun; and the elegance of their language consists, in some measure, in this capricious arrangement, or rather in this transposal and disorder of the words. See **LANGUAGE**.

CONSTRUCTION of Statutes among lawyers. See **LAW**, Part II. n° 49.

Consualia
↑
Consul.

CONSUALIA, feasts held among the ancients, in honour of the god *Consus*, i. e. Neptune; different from those other feasts of the same deity called *Neptunalia*. They were introduced with a magnificent cavalcade, or procession on horseback; by reason Neptune was reputed to have first taught men the use of horses; whence his surname of *Neptunus, equitarius*. Evander is said to have first instituted this feast: it was re-established by Romulus, under the name of *Consus*; in regard it was some god under the denomination of *Consus*, who (he pretended) suggested to him the rape of the Sabines. See **ROME**.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the eucharist. The divines of that profession maintain, that after consecration, the body and blood of our Saviour are substantially present, together with the substance of the bread and wine, which is called consubstantiation, or impanation.

CONSUL, the chief magistrate of the Roman commonwealth. They were two in number, chosen every year in the Campus Martius, by the people assembled in the comitia centuriata. In the first times of the commonwealth, no man could pretend to this dignity, but such as were of a patrician family; but afterwards the people obtained, that one of the consuls should be chosen from among them. A consul was commonly chosen at 43 years of age, but this was not always observed: besides, it was requisite he should have exercised other offices, as that of *quaestor*, *aedile*, and *praetor*: and yet this condition was no better observed than the first; for Pompey had never been *praetor* nor *quaestor* when he obtained the consulship. Their authority and power was of very great extent, so long as the commonwealth subsisted. They were the head of the senate: they commanded the armies, and were supreme judges of the differences between the citizens; but as they had made some abuse of this power, it was allowed by the Valerian law for the party aggrieved to appeal from their tribunal to the people, especially in cases where the life of a citizen was concerned. Under the emperors, consul was little more than an honourable title, and at last it became absolutely extinct in the time of Justinian. From the establishment of the republic to the consulate of Basil, that is, from the year of Rome 244, to the year of Rome 1294, the years are accounted by the consuls; but after that period, the time was computed by the years of the emperors reigns and the indictions.

CONSUL, at present, is an officer established by virtue of a commission from the king and other princes, in all foreign countries of any considerable trade, to facilitate and dispatch business, and protect the merchants of the nation. The consuls are to keep up a correspondence with the ministers of England residing in the courts whereon their consulate depends. They are to support the commerce and the interest of the nation; to dispose of the sums given and the presents made to the lords and principals of places, to obtain their protection, and prevent the insults of the natives on the merchants of the nation.

CONSUMMATION, the end, period, or completion

Consumption
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Continent.

of any work. Thus, we say, the *consummation* of all things, meaning the end of the world. By the incarnation, all the prophecies are said to be *consummated*. See PROPHECY, and ACCOMPLISHMENT.

Consummation of marriage, denotes the last act of marriage, which makes its accomplishment; or the most intimate union between the married pair, &c.

CONSUMPTION, in medicine, a word of very extensive signification, implies all disorders that bring any decay or waste upon the constitution; but is most commonly used for the *phthisis pulmonalis*. See (the *Index* subjoined to) MEDICINE.

CONSUMPTION, in fariery. See FARIERY, § viii.

CONSUS, the pagan god of counsel. He had an altar under ground in the great circus at Rome, to shew that counsel ought to be kept secret.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that do thus touch are called the *points* or *places of contact*.

CONTAGION, in phycic, the communicating a disease from one body to another. In some diseases it is only effected by an immediate contact or touch, as the venom of the pox; in others, it is conveyed by infected cloaths, as the itch; and in others, it is transmitted through the air at a considerable distance, by means of steams or effluvia expiring from the sick, as in the plague and other pellilential disorders, in which case the air is said to be contagious.

CONTEMPLATION, an act of the mind, whereby it applies itself to consider and reflect upon the works of God, nature, &c.

CONTEMPORARY, a person or thing that existed in the same age with another. Thus, Socrates, Plato, and Aristophanes, were contemporaries.

CONTEMPT, in a general sense, the act of despising, or the state of being despised.

CONTEMPT, in law, is a disobedience to the rules and orders of a court, which hath power to punish such offence; and as this is sometimes a greater, and sometimes a lesser offence, so it is punished with greater or less punishment, by fine, and sometimes by imprisonment.

CONTENT, in geometry, the area or quantity of matter or space included in certain bounds.

CONTESSA, a port-town of Turkey, in Europe, in the province of Macedonia, situated on a bay of the Archipelago, about 200 miles west of Constantinople. E. Long. 25. o. N. Lat. 41. o.

CONTEXT, among divines and critics, that part of scripture or of a writing that precedes and follows the text.

CONTI, a town of Picardy in France, with the title of a principality. It is seated on the river Seille, in E. Long. 2. 17. N. Lat. 49. 54.

CONTIGUITY, in geometry, is when the surface of one body touches that of another.

CONTIGUOUS, a relative term understood of things disposed to near each other, that they join their surfaces or touch. The houses in ancient Rome were not contiguous as ours are, but all insulated.

CONTINENT, in general, an appellation given to things continued without interruption; in which sense we say, *continent fever*, &c.

CONTINENT, in geography, a great extent of land

not interrupted by seas, in contradistinction to island and peninsula, &c. See GEOGRAPHY.—Sicily is said to have been anciently torn from the continent of Italy; and it is an old tradition, which some of our antiquaries still have a regard to, that Britain was formerly a part of the continent of France.

The world is usually divided into two great continents, the old and the new. Whether there exists, in the *southern hemisphere*, another continent, or the whole be only an immense watery region, is a question that for near three centuries has engaged the attention of the learned as well as the commercial world, and given rise to many interesting voyages and discoveries; concerning which, see the article SOUTH SEA.

CONTINGENT, something casual or unusual. Hence future contingent, denotes a conditional event which may or may not happen, according as circumstances fall out.

CONTINGENT, is also a term of relation for the quota that falls to any person upon a division. Thus each prince of Germany in time of war is to furnish so many men, so much money, and munition, for his contingent.

CONTINUED, or CONTINUAL, in a general sense, means incessant, or proceeding without interruption.

CONTINUED Fever, is such a one as sometimes remits, but never intermits or goes entirely off till its period.

CONTINUED Bass, in music, thus called, says Rousseau, because it is continued through the whole piece. Its principal use, besides that of regulating the harmony, is to support the voice and preserve the tone. They pretend that it was one *Ludovico Viana*, of whom a treatise still remains, who towards the end of the last century first put the continued bass in practice. See MUSIC, Art. 204.

CONTINUED Proportion, in arithmetic, is that where the consequent of the first ratio is the same with the antecedent of the second; as 4 : 8 :: 8 : 16; in contradistinction to discrete proportion.

CONTINUITY, is defined by some schoolmen the immediate cohesion of parts in the same quantum; by others, a mode of body, whereby its extremities become one; and by others, a state of body resulting from the mutual implication of its parts. There are two kinds of continuity, mathematical and physical. The first is merely imaginary, since it supposes real or physical parts where there are none. The other, or physical continuity, is that state of two or more particles, in which their parts are so mutually implicated as to constitute one uninterrupted quantity or continuum.

CONTINUO, in music, signifies the thorough bass, as *basso continuo* is the continual or thorough bass, which is sometimes marked in music-books by the letters B. C.

CONTOR, CONDOR, or CUNTUR, the American name of a species of VULTUR.

CONTORSION, in general, signifies the action of twisting or wrestling a member of the body out of its natural situation. Rope-dancers accustom themselves to contorsions of their limbs from their youth, to render the fibres of their articulations lax, and supple to all kinds of postures.

Contingent
|
Contortion.

Conson
Contract.

Contractile
Contract.

CONTORSION, in medicine, has many significations. 1. It denotes the iliac passion. 2. An incomplete dislocation, when a bone is in part, but not entirely, forced from its articulation. 3. A dislocation of the vertebrae of the back side-ways, or a crookedness of these vertebrae. And, 4. A disorder of the head, in which it is drawn towards one side, either by a spasmodic contraction of the muscles on the same side, or a palsy of the antagonist muscles on the other.

CONTORTÆ, the name of the 30th order in Linnaeus's Fragments of a natural method, consisting of plants which have a single petal that is twisted or bent to one side. This order contains the following genera, viz. echites, cerbera, gardenia, genipa, microcnemum, nerium, periplocia, rawolfia, tabernaemontana, vinca, apocynum, asclepias, comararia, ceropogia, cynanchum, plumeria, stapelia.

CONTOUR, in painting, the outline, or that which defines a figure.

A great part of the skill of the painter lies in managing the contours well. Contour, with the Italian painters, signifies the lineaments of the face.

CONTOURNE, in heraldry, is used when a beast is represented standing or running with its face to the sinister side of the escutcheon, they being always supposed to look to the right, if not otherwise expressed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lath. This sort of work seems to have had its origin in Greece; and to have been designed to perpetuate the memories of great men, particularly those who had bore away the prize at the solemn games. Such are those remaining of Homer, Solon, Euclid, Pythagoras, Socrates, and several athletes.

CONTRABAND, in commerce, a prohibited commodity, or merchandise bought or sold, imported or exported, in prejudice to the laws and ordinances of a state, or the public prohibitions of the sovereign. Contraband goods are not only liable to confiscation themselves, but also subject all other allowed merchandise found with them in the same box, bale or parcel, together with the horses, waggons, &c. which conduct them. There are contrabands likewise, which, besides the forfeiture of the goods, are attended with several penalties and disabilities.

CONTRACT, in a general sense, a mutual consent of two or more parties, who voluntarily promise and oblige themselves to do something; pay a certain sum, or the like. All donations, exchanges, leases, &c. are so many different contracts.

CONTRACT is particularly used in common law, for an agreement or covenant between two, with a lawful consideration or cause. As, if I sell my horse for money; or covenant, in consideration of L. 20, to make you a lease of a farm; these are good contracts, because there is *quid pro quo*.

Usurious CONTRACT, is a contract to pay more interest for money than the laws allow. See **USURY**.

Those contracts are said to be *null* which the law prohibits the making of; such are all contracts between persons incapable of contracting, as minors, religious, lunatics, wives without consent of their husbands, &c.

CONTRACT is also used for the instrument in writ-

ing, which serves as a proof of the consent granted, and the obligation passed between the parties.

Among the ancient Romans, contracts, and all voluntary acts, were wrote, either by the parties themselves, or by one of the witnesses, or by a domestic secretary of one of the parties, whom they called a *notary*, but who was no public person as among us.

The contract, when finished, was carried to the magistrate, who gave it a public authority by receiving it *inter actus*, into the number of acts under his jurisdiction; giving each of the parties a copy thereof, transcribed by his clerks or domestic registers, and sealed with his seal. Which practice passed into France, where it obtained a long time.

CONTRACTILE FORCE, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themselves up again to their former dimensions.

CONTRACTION, in grammar, is the reducing of two syllables into one, as *can't* for *cannot*, *should'st* for *shouldest*, &c.

CONTRACTION, in physics, the diminishing the extent or dimensions of a body, or the causing its parts to approach nearer to each other, in which sense it stands opposed to dilatation or expansion.

CONTRADICTION, a species of direct opposition, wherein one thing is found diametrically opposite to another.

CONTRADICTIONARY PROPOSITIONS, are opposites, one of which imports a mere and naked denial of the other.

Seeming contradictions are when the members of a period quite disagree in appearance and sound, but perfectly agree and are consistent in sense: thus,

"Towards die many times before their death;

"The valiant never taste of death but once."

SHAKESPEARE.

CONTRA-FISSURE, in surgery, a kind of fracture, or fissure, in the cranium, which sometimes happens on the side opposite to that which received the blow, or, at least, at some distance from it.

CONTRARIETY, an opposition between two things, which imports their being contrary to one another; and consists in this, that one of the terms implies a negation of the other, either mediately or immediately; so that contrariety may be said to be the contrast, or opposition of two things, one of which imports the absence of the other, as love and hatred.

CONTRARY, a positive opposite, which, subsisting by turns in the same subject with its opposite, is as remote from it as possible, expels it, and is mutually expelled by it. Blackness and whiteness, cold and heat, are such contraries.

CONTRAST; opposition or dissimilitude of figures, by which one contributes to the visibility or effect of the others. See **RESSEMBLANCE**.

CONTRAST, in painting and sculpture, expresses an opposition or difference of position, attitude, &c. of two or more figures, contrived to make variety in a painting, &c. as where, in a groupe of three figures, one is shewn before, another behind, and another side-ways, they are said to be in contrast.

The contrast is not only to be observed in the position of several figures, but also in that of the several members

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members of the same figure : thus, if the right arm advance farthest, the right leg is to be hindermost ; if the eye be directed one way, the arm to go the contrary way, &c. The contrast must be pursued even in the drapery.

CONTRAST, in architecture, is to avoid the repetition of the same thing, in order to please by variety.

CONTRATE-WHEEL, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to those of the other wheels, from whence it takes its name. See WATCH-MAKING.

CONTRAVALLATION, or the *Line CONTRAVALLATION*, in fortification, a trench guarded with a parapet, and usually cut round about a place by the besiegers, to secure themselves on that side, and to stop the sallies of the garrison. See FORTIFICATION.

CONTRAVENTION, in law, a man's failing to discharge his word, obligation, duty, or the laws or customs of the place.

CONTRAYERVA, in botany. See DORSTENIA.

CONTRE, in heraldry, an appellation given to several bearings, on account of their cutting the shield contrary and opposite ways : thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the same nature opposite to each other, so as colour may be opposed to metal, and metal to colour.

CONTRIBUTION, the payment of each person's quota, or the part he is to bear in some imposition, or common expence. See CONTINGENT, &c.—Contributions are either involuntary, as those of taxes and imposts ; or voluntary, as those of expences for carrying on some undertaking for the interest of the community.

CONTRIBUTIONS, in a military sense, are impositions paid by frontier countries to secure themselves from being plundered, and ruined by the enemy's army. The peasants till their ground under the faith of contributions, as securely as in time of profound peace.

CONTRITION, in theology, a sorrow for our sins, resulting from the reflection of having offended God, from the sole consideration of his goodness, without any regard to the punishment due to the trespass, and attended with a sincere resolution of reforming them. The word is derived from the Latin *contrerere*, to break or bruise.

CONTROL is properly a double register kept of acts, issues, &c. of the officers or commissioners in the revenue, army, &c. in order to perceive the true state thereof, and to certify the truth, and the due keeping of the acts subject to the enregistrement.

CONTROLLER, an officer appointed to control or oversee the accounts of other officers ; and, on occasion, to certify whether or no things have been controlled or examined.

In Britain we have several officers of this name ; as controller of the king's house, controller of the navy, controller of the customs, controller of the mint, &c.

CONTROLLER of the *Hanaper*, an officer that attends the lord chancellor daily, in term and in seal-time, to take all things sealed in leathern bags from

the clerks of the hanaper, and to make the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the same, and to charge the clerk of the hanaper with them.

CONTROLLER of the *Pipe*, an officer of the exchequer, that makes out a summons twice every year, to levy the farms and debts of the pipe. See PIPE, and EXCHEQUER.

CONTROLLERS of the *Pells*, two officers of the exchequer, who are the chamberlain's clerks, and keep a control of the pell of receipts, and goings out.

CONTUMACY, in law, a refusal to appear in court when legally summoned, or the disobedience to the rules and orders of a court, having power to punish such offence.

CONTUSION, in medicine and surgery, any hurt of the body that is inflicted by a blunt instrument. See SURGERY.

CONVALLARIA, or *LILY of the Valley*, in botany, a genus of the hexandria order, belonging to the monogynia class of plants. The species are eight, three of which are natives of Britain, viz. the majalis, or may-lily ; the multiflora, or solomon's-seal ; and the polygonatum, or sweet-smelling solomon's-seal. They are plants of considerable beauty, and may easily be propagated by their creeping roots.

CONVENT, in church-history. See MONASTERY.

CONVENTICLE, a private assembly or meeting for the exercise of religion. The word was first attributed as an appellation of reproach to the religious assemblies of Wickliffe in the reigns of Edward III. and Richard II. There were several statutes made in former reigns, for the suppression of conventicles ; but, by 1 William and Mary, it is ordered, that dissenters may assemble for the performance of religious worship, provided their doors be not locked, barred, or bolted.

CONVENTION, a treaty, contract, or agreement between two or more parties.

CONVENTION is also a name given to an extraordinary assembly of parliament, or the estates of the realm, held without the king's writ ; as was the convention of estates, who, upon the retreat of king James II. came to a conclusion that he had abdicated the throne, and that the right of succession devolved to king William and queen Mary ; whereupon their assembly expired as a convention, and was converted into a parliament.

CONVENTUAL, something belonging to a convent or monastery. See MONASTERY, and COENOBITE.

CONVENTUAL is particularly used for a religious who actually resides in a convent ; in contradistinction to those who are only guests, or are entertained there, or in possession of benefices depending on the house. See MONK.

CONVERGING, or CONVERGENT *Lines*, in geometry, are such as continually approach nearer one another, or whose distances become still less and less. These are opposed to divergent lines, the distances of which become continually greater : those lines which converge one way, diverge the other.

CONVERGING *Rays*, in optics, those rays that, issuing

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fuings from divers points of an object, incline towards another, till, at last, they meet and cross, and then become diverging rays.

CONVERSE, in mathematics. One proposition is called the *converse* of another, when, after a conclusion is drawn from something supposed in the converse proposition, that conclusion is supposed; and then, that which in the other was supposed, is now drawn as a conclusion from it: thus, when two sides of a triangle are equal, the angles under these sides are equal; and, on the converse, if these angles are equal, the two sides are equal.

CONVERSION, in a moral sense, implies a repentance for a temper and conduct unworthy our nature, and unbecoming our obligations to its Author, and a resolution to act a wiser and a better part for the future.

CONVERSION, in war, a military motion whereby the front of a battalion is turned where the flank was, in case the battalion is attacked in the flank.

CONVERSION of Equations, the same with reduction of equations by multiplication. See **ALGEBRA**, n^o 17.

CONVEX, an appellation given to the exterior surface of gibbous or globular bodies; in opposition to the hollow inner surface of such bodies, which is called *concave*: thus we say, a convex frieze, lens, mirror, superficies, &c.

CONVEXITY, the exterior surface of a convex, *i. e.* gibbous and globular thing; in opposition to concavity, or the inner surface, which is hollow or depressed. See **CONCAVE**.

The word is of particular import in catoptrics and dioptrics; where it is applied to mirrors and lenses.

A convex mirror represents its images smaller than the objects; as a concave one represents them larger: a convex mirror reflects the rays from it, diverging; and therefore disperses and weakens their effect: as a concave one reflects them converging, so as they concur in a point, and have their effect increased: and by how much the mirror is a portion of a smaller sphere, by so much does it diminish the objects, and disperse the rays the more. See **MIRROR**.

A convex lens is either convex on both sides, called a *convexo-convex*; or it is plain on one side, and convex on the other, called a *plano-convex*: or concave on one side, and convex on the other, called a *convexo-concave*, or *concavo-convex*; as the one or the other surface prevails, *i. e.* as this or that is a portion of a smaller sphere. All convex lenses infect the rays of light in their passage, *i. e.* send them out from their convex surface converging, so as that they concur in a point or focus. Hence all convex lenses magnify, *i. e.* represent their images larger than their objects; and this the more, as they are portions of smaller spheres.

CONVEYANCE, in law, a deed or instrument that passes land, &c. from one person to another.

CONVICT, in common law, a person that is found guilty of an offence by the verdict of a jury. See the following article.

CONVICTION, in theology, expresses the first degree of repentance, wherein the sinner becomes

sensible of his guilt, of the evil nature of sin, and of Conviction. the danger of his own ways.

CONVICTION, in law. When a jury has given a verdict upon trial, finding the prisoner guilty, he is said to be *convicted* of the crime whereof he stands indicted. See **TRIAL**.

When the offender is thus convicted, there are two collateral circumstances that immediately arise. 1. On a conviction in general for any felony, the reasonable expences of prosecution are by statute 25 Geo. II. c. 36. to be allowed the prosecutor out of the county-stock, if he petitions the judge for that purpose; and by statute 27 Geo. II. c. 3. poor persons, bound over to give evidence, are likewise entitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larciny in particular, the prosecutor shall have restitution of his goods by virtue of the statute 21 Hen. VIII. c. 11. For by the common law there was no restitution of goods upon an indictment; because it is at the suit of the king only; and therefore the party was enforced to bring an appeal of robbery, in order to have his goods again. But, it being considered that the party prosecuting the offender by indictment, deserves to the full as much encouragement as he who prosecutes by appeal, this statute was made, which enacts, that if any person be convicted of larciny by the evidence of the party robbed, he shall have full restitution of his money, goods and chattels, or the value of them out of the offender's goods, if he has any, by a writ to be granted by the justices. And the construction of this act having been in great measure conformable to the law of appeals, it has therefore in practice superseded the use of appeals of larciny. For instance, as formerly upon appeals, so now upon indictments of larciny, this writ of restitution shall reach the goods so stolen, notwithstanding the property of them is endeavoured to be altered by sale in market overt. And though this may seem somewhat hard upon the buyer, yet the rule of law is, that *spoliatus debet ante omnia restitui*, especially when he has used all the diligence in his power to convict the felon. And, since the case is reduced to this hard necessity, that either the owner or the buyer must suffer; the law prefers the right of the owner, who has done a meritorious act by pursuing a felon to condign punishment, to the right of the buyer, whose merit is only negative, that he has been guilty of no unfair transaction. And it is now usual for the court, upon the conviction of a felon, to order, without any writ, immediate restitution of such goods as are brought into court, to be made to the several prosecutors. Or else, secondly, without such writ of restitution, the party may peaceably retake his goods, wherever he happens to find them, unless a new property be fairly acquired therein. Or lastly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods; and recover a satisfaction in damages. But such action lies not before prosecution; for so felonies would be made up and healed: and also reception is unlawful, if it be done with intention to smother and compound the larciny; it then becoming the heinous offence of *theft-bote*.

It is not uncommon, when a person is convicted of

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a misdemeanour, which principally and more immediately affects some individual, as a battery, imprisonment, or the like, for the court to permit the defendant to *speak with the prosecutor*, before any judgement is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done to reimburse the prosecutor his expences, and make him some private amends, without the trouble and circuity of a civil action. But it is surely a dangerous practice: and, though it may be entrusted to the prudence and discretion of the judges in the superior courts of record, it ought never to be allowed in local or inferior jurisdictions, such as the quarter-sessions; where prosecutions for assaults are by this means too frequently commenced, rather for private lucre, than for the great ends of public justice. Above all, it should never be suffered, where the testimony of the prosecutor himself is necessary to convict the defendant: for by this means the rules of evidence are entirely subverted; the prosecutor becomes in effect a plaintiff, and yet is suffered to bear witness for himself. May even a voluntary forgiveness by the party injured, ought not, in true policy, to intercept the stroke of justice. "This, says an elegant writer, (who pleads with equal strength for the *certainty*, as for the lenity of punishment) may be an act of good nature and humanity, but it is contrary to the good of the public. For, although a private citizen may dispense with satisfaction for his private injury, he cannot remove the necessity of public example. The right of punishing belongs not to any one individual in particular, but to the society in general, or to the sovereign who represents that society; and a man may renounce his own portion of this right, but he cannot give up that of others."

CONVOCATION, an assembly of the clergy of England, by their representatives, to consult of ecclesiastical matters. It is held during the session of parliament, and consists of an upper and a lower house. In the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors; consisting of all the deans and archdeacons, of one proctor for every chapter, and two for the clergy of every diocese, in all 143 divines; viz. 22 deans, 53 archdeacons, 24 prebendaries, and 44 proctors of the diocesan clergy. The lower house chuses its prolocutor; whose business it is to take care that the members attend, to collect their debates and votes, and to carry their resolutions to the upper house. The convocation is summoned by the king's writ, directed to the archbishop of each province, requiring him to summon all bishops, deans, archdeacons, &c.

The power of the convocation is limited by a statute of Henry VIII. They are not to make any canons or ecclesiastical laws, without the king's licence; nor, when permitted to make any, can they put them in execution, but under several restrictions. They have the examining and censuring all heretical and schismatical books and persons, &c.: but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their servants, have the same privileges as members of parliament.

CONVOLUTION, a winding motion, proper to the trunks of some plants, as the convolvulus, or bind-

weed; the clasps of vines, bryony, &c.

CONVOLVULUS, BIND-WEED, a genus of the pentandria order belonging to the monogynia class of plants. Of this there are 43 species, the most remarkable of which are the following.

1. The *scilium*, or large white bind-weed, is often a troublesome weed in gardens, when its roots are interwoven with those of trees and shrubs, or under hedges, as every small piece of root is apt to grow. It flourishes under moist hedges, and hath white or purplish blossoms. 2. The *scammonia*, or Syrian bind-weed, grows naturally in Syria. The roots are thick, run deep into the ground, and are covered with a dark bark. The branches extend on every side to the distance of 10 or 12 feet; they are slender, and trail on the ground, and are garnished with narrow, arrow-pointed leaves. The flowers are of a pale yellow, and come out from the side of the branches, two fitting upon each long foot-stalk; these are succeeded by roundish seed-vessels, having three cells filled with seeds. 3. The *purpureus*, or convolvulus major, is an annual plant growing naturally in Asia and America, but has been long cultivated in the British gardens. If these plants are properly supported they will rise 10 or 12 feet high in warm summers. There are three or four lasting varieties: the most common hath a purple flower; the others have a white, a red, or a whitish-blue flower, which last hath white seeds. They flower in June, July, and August, and their seeds ripen in autumn. 4. The *nil*, or blue bind-weed, rises with a twining stalk 8 or 10 feet high, garnished with heart-shaped leaves, divided into three lobes, which end in sharp points. These are woolly, and stand upon long foot-stalks. The flowers also come out on long foot-stalks, each sustaining two flowers of a very deep blue colour, whence their name of *anil* or *indigo*. This is one of the most beautiful plants of the genus: it flowers all the latter part of the summer; and in good seasons the seeds ripen very well in the open air. 5. The *battatas*, or Spanish potatoes, hath esculent roots, which are annually imported from Spain and Portugal, where they are greatly cultivated for the table; but they are too tender to thrive in the open air in Britain. Their roots are like the common potato, but require much more room: for they send out many trailing stalks, which extend six or eight feet every way; and at their joints send out roots which in warm countries grow to be very large bulbs; so that from a single root planted, 40 or 50 large potatoes are produced. 6. The *canariensis*, with soft woolly leaves, is a native of the Canaries; but hath long been preserved in the British gardens. It hath a strong fibrous root, from whence arise several twining woody stalks, from, where they have support, will grow more than 20 feet high, garnished with oblong heart-shaped leaves, which are soft and hairy. The flowers are produced from the wings of the leaves, several standing upon one footstalk. They are for the most part of a pale blue; but there is a variety with white flowers. They appear in June, July, and August, and sometimes ripen seeds here. 7. The *tricolor*, or convolvulus minor, is a native of Portugal; but hath long been cultivated in the gardens of this country. It is an annual plant, which hath several thick herbaceous

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herbaceous stalks growing about two feet long, which do not twine like the other forts, but decline toward the ground, upon which many of the lower branches lie prostrate; they are garnished with spear-shaped leaves, which fit close to the branches: the footstalks of the flowers come out just above the leaves of the same joint, and at the same side of the stalks. They are about two inches long, each sustaining one large open bell-shaped flower, which in some is of a fine blue colour with a white bottom; in others they are pure white, and some are beautifully variegated with both colours. The white flowers are succeeded by white seeds, and the blue by dark-coloured seeds; which difference is pretty constant. 8. The foldanella, or sea-bindweed, styled also *brassica marina*, grows naturally on the sea-beaches in many parts of England, but cannot be long preserved in gardens. It hath many small white stringy roots, which spread wide and send out several weak trailing branches. These twine about the neighbouring plants like those of the common bindweed, garnished with kidney-shaped leaves like those of the lesser celandine. The flowers are produced on the side of the branches at each joint. They are of a reddish purple colour, and appear in July. They are succeeded by round capsules, having three cells, each containing one black seed. 9. The turpethum is a native of the island of Ceylon. This hath fleshy thick roots, which spread far in the ground, and abound with a milky juice that flows out when the roots are broken or wounded, and soon hardens into a resinous substance when exposed to the sun and air. From the root shoots forth many twining branches, which twist about each other, or the neighbouring plants, like the common bindweed. They are garnished with heart-shaped leaves that are soft to the touch, like those of the marshmallow. The flowers are produced at the joints on the side of the stalks, several standing together on the same footstalk: they are white, and shaped like those of the common great bindweed, and are succeeded by round capsules, having three cells containing two seeds each. 10. The jalapa, or jalap, used in medicine, is a native of Haleppo in Spanish America, situated between La Vera Cruz and Mexico. It hath a large root of an oval form, which is full of a milky juice; from which come out many herbaceous twining stalks rising eight or ten feet high, garnished with variable leaves; some of them being heart-shaped, others angular, and some oblong and pointed. They are smooth, and stand upon long footstalks: the flowers are shaped like those of the common greater bindweed, each footstalk supporting only one flower.

Culture. The first and second sorts are propagated by seeds, which must be sown on a border of light earth. The second sort must have some tall stakes placed near them for their branches to twine about, otherwise they will spread on the ground and make a bad appearance. The third sort is annual, and must be propagated by seeds sown on a hot-bed in the spring, and towards the end of May they should be planted out in warm borders, and treated in the same manner with the former. The fourth species is sometimes propagated in this country. The roots must be planted on a hot-bed in the spring; and if the plants are covered in bad weather with glasses, they will

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produce flowers and some small bulbs from the joints of the stalks: but if they are exposed to the open air they seldom grow to any size. The fifth is propagated by laying down the young shoots in the spring, which generally put out roots in three or four months: they may then be taken from the old plants, and each placed in a separate pot, which is to be set in the shade till they have taken new root; after which they may be placed with other hardy green-house plants till autumn, when they should be removed into the green-house, and afterwards treated in the same manner as myrtles and other green-house plants. The turbith and jalap are too tender to live in this country, unless they are constantly kept in a stove. The other species require no particular directions for their cultivation.

Uses. The root of the first sort is a very acrid purgative to the human race, but is eaten by hogs in large quantities without any detriment. The inspissated juice of this might probably answer the purposes of scammony, which at present is imported from Aleppo at a considerable annual expence. The inspissated juice of the second species is used in medicine as an acrid purgative; as are also the roots of JALAP and TURPETH. The foldanella has likewise been used with the same intention. Half an ounce of the juice, or a drachm of the powder, is an acrid purge. The leaves applied externally are said to diminish dropsical swellings of the feet.

CONVOY, in naval affairs, one or more ships of war, employed to accompany and protect merchant-ships, and prevent their being insulted by pirates, or the enemies of the state in time of war.

CONVOY, in military matters, a body of men that guard any supply of men, money, ammunition, or provisions, conveyed by land into a town, army, or the like, in time of war.

CONUS, a cone, in botany; a species of fruit or scaly seed-vessel, so termed by Tournefort and other botanists. Linnæus has substituted STROBIUS in its place.

CONVULSION, a preternatural and violent contraction of the membranous and muscular parts of the body. See (the *Index* subjoined to) MEDICINE.

CONWAY, a market-town of Carnarvonshire in North Wales, situated near the mouth of a river of the same name, 15 miles west of St Asaph. W. Long. 3. 50. N. Lat. 53. 20.

CONYZA, FLEABANE; a genus of the order of syngenesia, belonging to the polygamia superflua class of plants. There are 19 species, none of which merit any particular description.

CONZA, a town of the kingdom of Naples in Italy, situated on the farther principate, on the river Ofanto, 50 miles south-east of the city of Naples. E. Long. 16. 0. N. L. 41. 0. It is the see of an archbishop.

COOKE (Sir Anthony), descended from Sir Thomas Cooke lord mayor of London, was born in 1506, and supposed to have been educated at Cambridge. He was so eminent for his learning, piety, and prudence, that the guardians of king Edward VI. appointed him to be his chief instructor in learning, and to form his manners. He had four daughters, and being resolved to have sons by education, left he should have

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none by birth, he taught his daughters those lessons by night that he had instilled into the prince by day: he was happy in his endeavours, as they proved learned in Greek and Latin, and equally distinguished by virtue, piety, and good fortune. Mildred was married to the great lord Burleigh; Ann to Sir Nicholas Bacon, lord keeper of the great seal; Elizabeth to Sir John Russell, son and heir of Francis earl of Bedford; and Catharine to Sir Henry Killigrew. He lived in exile during the Marian persecution; and returning on the accession of queen Elizabeth, spent the rest of his days in peace and honour, dying in 1576.

COOLERS, in medicine, those remedies which produce an immediate sense of cold, being such as have their parts in less motion than those of the organs of feeling; as fruits, and all acid liquors. Or they are such as by a particular viscosity, or grossness of parts, give the animal fluids a greater consistency than they had before, and consequently retard their motion, having less of that intestine force on which their beat depends: of this sort are cucumbers, and all substances producing viscosity.

COOM, a term applied to the foot that gathers over an oven's mouth; also for that black, greasy substance, which works out of the wheels of carriages.

COOMB, or COMB, of Corn, a dry measure containing 4 bushels, or half a quarter.

COOPER, on board a ship, he that looks to the casks and all other vessels for beer, water, or any other liquor. He hath a mate under him.

COOPER (Anthony-Ahley), first-earl of Shaftesbury, a most able statesman, was the son of Sir John Cooper, bart. of Rockborn in Hampshire, and was born in 1621. He was elected member for Tewkesbury at 19 years of age, in the short parliament that met April 13th 1640. He seems to have been well affected to the king's service at the beginning of the civil wars; for he repaired to the king at Oxford with offers of assistance: but prince Maurice breaking articles to a town in Dorsetshire that he had got to receive him, furnished him with a pretence for going over to the parliament, from which he accepted a commission. When Richard Cromwell was deposed, and the Rump came again into power, they nominated Sir Anthony one of their council of state, and a commissioner for managing the army. At that very time he had engaged in a secret correspondence for restoring Charles II. and, upon the king's coming over, was sworn of his privy council. He was one of the commissioners for the trial of the regicides; was soon after made chancellor of the exchequer, then a commissioner of the treasury; in 1672 was created earl of Shaftesbury; and soon after was raised to the post of lord chancellor. He filled this office with great ability and integrity; and though the short time he was at the helm was in a tempestuous season, it is doing him justice to say, nothing could either distract or affright him. The great seal was taken from him in 1673, 12 months after his receiving it; but, though out of office, he still made a distinguished figure in parliament, for it was not in his nature to remain inactive. He drew upon himself the implacable hatred of the duke of York, by steadily promoting, if not originally inventing, the famous project of an exclusion-bill. When his enemies

came into power, he found it necessary to consult his safety by retiring into Holland, where he died six weeks after his arrival, in 1683. While his great abilities are confessed by all, it has been his misfortune to have his history recorded by his enemies, who studied to render him odious. Butler has given a very severe character of him in his Hudibras.

COOPER (Anthony Ahley), earl of Shaftesbury, was son of Anthony earl of Shaftesbury, and grandson of Anthony first earl of Shaftesbury, lord high chancellor of England. He was born in 1677, at Exeter-house in London, where his grandfather lived, who from the time of his birth conceived so great an affection for him, that he undertook the care of his education; and and he made so good a progress in learning, that he could read with ease both the Latin and Greek languages, when only 11 years old. In 1683, his father carried him to the school at Winchester, where he was often insulted on his grandfather's account, whose memory was odious to the zealots for despotic power: he therefore prevailed with his father to consent to his desire of going abroad. After three years stay abroad, he returned to England, in 1689, and was offered a seat in parliament in some of those boroughs where his family had an interest. But this offer he did not now accept, that he might not be interrupted in the course of his studies, which he prosecuted five years more, with great vigour and success; till, on Sir John Trenchard's death, he was elected burgess for Poole. Soon after his coming into parliament, he had an opportunity given him of expressing that spirit of liberty by which he uniformly directed his conduct on all occasions. It was the bringing in and promoting "the act for regulating trials in cases of high treason." But the fatigues of attending the house of commons, in a few years so impaired his health, that he was obliged to decline coming again into parliament after the dissolution in 1698. He then went to Holland, where the conversation of Mr Bayle, Mr le Clerc, and several other learned and ingenious men, induced him to reside a twelvemonth. Soon after he returned to England he became earl of Shaftesbury. But his own private affairs hindered him from attending the house of lords till the second year of his peerage, when he was very earnest to support king William's measures, who was at that time projecting the grand alliance. So much was he in favour with king William, that he had the offer of secretary of state; but his declining constitution would not allow him to accept it. Though he was disabled from engaging in business, the king consulted him on matters of very high importance; and it is pretty well known that he had the greatest share in composing that celebrated last speech of king William, December 31st 1701. On Queen Anne's accession to the throne, he returned to his retired manner of life, being no longer advised with concerning the public; and was then removed from the vice admiralty of Dorset, which had been in the family for three generations. In 1703, he made a second journey to Holland, and returned to England the year following. The French prophets soon after this, having by their enthusiastic extravagancies made a great noise throughout the nation, and, among different opinions, some advising a prosecution, the lord Shaftesbury apprehended

Cooper.

prehended that such measures tended rather to inflame than to cure the disease, and this occasioned his *letter concerning Enthusiasm*. In 1711, finding his health still declining, he was advised to seek assistance from a warmer climate, and accordingly set out for Naples; where he lived near two years, and died there in 1713. In the three volumes of his characteristics, he completed the whole of his writings which he intended should be made public, though we have several pieces of his published by other hands. His principal study was the writers of antiquity, from which he formed to himself the plan of his philosophy.

COOPER (Samuel), a very eminent English miniature painter, born in 1609, and bred under the care of his uncle John Hoskins. He derived, however, his principal excellence from a study of the works of Van Dyck, in whose time he lived; inasmuch that he was commonly styled "Van Dyck in little." His pencil was chiefly confined to the head, in which, with all its dependences, especially the hair, he was inimitable; but if he descended lower, his incorrectness was notorious. He died in 1672; and his pieces are universally admired all over Europe, selling for incredible prices. —He had a brother, Alexander, likewise a good miniature painter, who became limner to Christina queen of Sweden.

COOPER (Thomas), a pious and learned prelate in the reign of queen Elizabeth, was born at Oxford about the year 1517. He was educated in the school adjoining to Madalene college, of which he was a choirster; where also, in 1539, he was elected probationer, and fellow in the following year. About the year 1546, quitting his fellowship, he applied himself to the study of physic, in 1556 took the degree of bachelor in that faculty, and practised as physician at Oxford. Being inclined to the Protestant religion, probably this was only a prudent suspension of his final intentions, during the Popish reign of queen Mary: for, on the accession of Elizabeth, he resumed the study of divinity; became a celebrated preacher, was made dean of Christchurch and vice-chancellor of the university, having accumulated the degrees of bachelor and doctor in divinity. In 1569 he was made dean of Gloucester; and, the year following, bishop of Lincoln: whence, in 1584, he was translated to the see of Winchester; in which city he died on the 29th of April 1594, and was buried in the cathedral there, on the south side of the choir. The several writers who have mentioned Dr Cooper, unanimously give him the character of an eloquent preacher, a learned divine, and a good man. He had the misfortune while at Oxford to marry a lady whose gallantries became notorious: nevertheless he would not be divorced from her; knowing that he could not live without a wife, he did not chuse "to charge his conscience with the scandal of a second marriage." —He wrote, 1. the Epitome of Chronicles from the 17th year after Christ, to 1540, and thence after to 1560. 2. *Theſaurus linguæ Romanæ et Britannicæ*. This dictionary, which is an improvement upon Elyot's, was much admired by queen Elizabeth, who thence forward determined to promote the author. 3. A brief exposition of such chapters of the Old Testament, as usually are read in the church, at common prayer, on Sundays throughout the year.

4. An admonition to the people of England. 5. Ser. Co-ordinate mons.

CO-ORDINATE, something of equal order, rank or degree with another.

COOT, in ornithology. See FULICA.

COOTWICH (John), doctor of laws, was born at Utrecht, and spent great part of his life in travelling. He published in Latin, in 1619, and account of his journey from Jerusalem, and from Syria; which is very scarce and in high esteem. Time of his death uncertain.

COPAIBA, or *Balsam of COPAIBA*, a liquid resinous juice, flowing from incisions made in the trunk of the fera, a large tree which grows in the Spanish West Indies; and is used as a corroborating and detergent medicine.

COPAL, improperly called *gum copal*, is a gum of the resinous kind brought from New Spain. It is the concrete juice of a tree which grows in these parts; and comes to us in irregular masses, some of which are transparent, and of different shades as to colour, from a light yellow to a deep brown. Some pieces are whitish and semi-transparent. To the smell it is more agreeable than frankincense; but hath neither the solubility in water common to gums, nor in spirit of wine common to resins, at least in any considerable degree. By these properties it resembles amber; which has induced some to think it a mineral bitumen resembling that substance. In distillation it yields an oil, which like mineral petrolea is indissoluble in spirit of wine. Copal itself is soluble in the essential oils, particularly in that of lavender, but not easily in the expressed ones. It may, however, be dissolved in linseed oil by digestion, with a heat very little less than is sufficient to boil or decompose the oil. This solution, diluted with spirit of turpentine, forms a beautiful transparent varnish, which when properly applied, and slowly dried, is very hard and durable. This varnish is applied to snuff-boxes, tea-boards, and other utensils. It preserves and gives lustre to paintings, and greatly restores the decayed colours of old pictures, by filling up the cracks and rendering the surfaces capable of reflecting light more uniformly.

COPE, an ecclesiastical ornament, usually worn by chanters, and sub-chanters, when they officiate in solemnity. It reaches from the shoulders to the feet. The ancients called it *pluviale*. —The word is also used for the roof or covering of a house, &c.

COPE is also the name of an ancient custom or tribute due to the king, or lord of the soil, out of the lead-mines in some part of Derbyshire; of which Manlove saith thus:

Egrefs and regrefs to the king's highway,
The miners have; and *lot* and *cope* they pay:
The thirteenth dish of ore within their mine,
To the lord, for *lot*, they pay at measuring time;
Sixpence a load for *cope* the lord demands,
And that is paid to the *burghmaster*'s hands.

This word by domesday-book, as Mr Hager hath interpreted it, signifies a hill: and *cope* is taken for the supreme cover, as the *cope of heaven*.

COPENHAGEN, the capital of the kingdom of Denmark, situated on the eastern shore of the island of Zealand, upon a fine bay of the Baltic sea, not far

Co-ordinate
Copen-
ha-
gen.

Copenha- from the strait called the Sound : E. Long. 13. 0.
gen. Lat. 55. 30.

Copernican. This city is neither very large nor very ancient. The precise date of its foundation is disputed; but the most probable account is, that it took its rise from a castle built on the spot in the year 1168, by archbishop Wide, as a protection against the pirates which at that time swarmed in the Baltic. The convenience of the situation, and the security afforded by the castle, soon induced a number of the inhabitants of Zealand to resort thither; so that at length it became a fine city, and the capital of the kingdom. According to Molelt-worth, it approaches nearly to the size of Bristol. The walls in his time inclosed a great deal more ground than was occupied by the houses; but as in his time they were daily increasing, it is probable that now the vacant space is in a great measure filled up. Its advantageous situation for trade, and the excellency of its harbour, are not to be surpassed; and were Copenhagen a free port, there is no doubt but it would soon become the emporium of the commerce into the Baltic. The harbour is surrounded by the fortifications of the town; and the entrance is so narrow, that only one ship can enter at a time. In the night-time this entrance is shut up by a strong boom laid across. The passage is defended on the one side by the cannon of the citadel, and on the other by a strong block-house, well mounted with heavy artillery. The whole haven is capable of containing 500 sail of large ships. It is inclosed by a wooden gallery, close to which every ship has her appointed station; a circumstance that adds greatly to the beauty and convenience of the scene, than which nothing can be more rich and regular, when a number of shipping happen to lie in the port. The city is strong both by nature and art; the situation being marshy, deep canals cut all round, and the fortifications executed agreeable to the best modern improvements; but the works are chiefly composed of turf and earth. Experience has shewn its strength; it having sustained two remarkable sieges against a fine Swedish army, flushed with victory, and headed by the most magnanimous princes of the age. It is probable, indeed, from these instances, that an enemy may carry on their approaches more easily in winter than in summer, the dykes being then covered over with ice, upon which the Swedish army marched. Its security, however, in this particular, consists in the impossibility of an army's keeping the field long amidst the rigorous winters of all northern climates. The buildings of the town are in general mean and deplorable: even the king's palace is surpassed by the houses of private gentlemen in other countries. There are, however, a few good buildings, as the change, arsenal, and observatory, erected by order of that excellent prince Christian IV. to whom almost all the decorations of Copenhagen are owing. What adds greatly to the convenience of the city is the neighbourhood of the little island of *Finack*, or rather *Amack*, joined to it by a bridge. From this place the markets of the city are supplied with fowl, beef, mutton, venison, corn, and culinary vegetables, which are produced here in the greatest abundance.

COPERNICAN, in general, something belonging to Copernicus. Hence,

COPERNICAN System or Hypothesis, that system of Copernicus the world, wherein the sun is supposed to rest in the centre, and the planets, with the earth, to move in ellipses round him. See COPERNICUS.

COPERNICUS (Nicolaus), an eminent astronomer, was born at Thorn in Prussia, in the year 1472. He was taught the Latin and Greek languages at home; and afterwards sent to Cracovia, where he studied philosophy and physics. His genius in the mean time was naturally turned to mathematics, which he pursued through all its various branches. He set out for Italy when he was 23 years of age; but staid at Bonaonia some time, for the sake of being with the celebrated astronomer of that place, Dominicus Maria; whose conversation, however, and company, he affected, not so much as a learner, as an assistant to him in making his observations. From thence he passed to Rome, where he was no sooner arrived than he was considered as not inferior to the famous Regiomontanus; and acquired in short so great a reputation, that he was chosen professor of mathematics, which he taught for a long time with great applause. He also made some astronomical observations there about the year 1500. Returning to his own country some years after, he began to apply his vast knowledge in mathematics to correct the system of astronomy which then prevailed. He set himself to collect all the books which had been written by philosophers and astronomers, and to examine all the various hypotheses they had invented for the solution of the celestial phenomena; to try if a more symmetrical order and constitution of the parts of the world could not be discovered, and a more just and exquisite harmony in its motions established, than what the astronomers of those times so easily admitted. But of all their hypotheses none pleased him so well as the Pythagorean, which made the sun to be the centre of the system, and supposed the earth to move not only round the sun, but round its own axis also. He thought he discerned much beautiful order and proportion in this; and that all that embarrassment and perplexity from epicycles and excentrics, which attended the Ptolemaic hypothesis, would here be entirely removed.

This system, then, he began to consider, and to write upon, when he was about 35 years of age. He employed himself in contemplating the phenomena carefully; in making mathematical calculations; in examining the observations of the ancients, and in making new ones of his own; and after more than 20 years chiefly spent in this manner, he brought his scheme to perfection, and established that system of the world which goes by his name, and is now universally received, (see ASTRONOMY, n° 74.) His system, however, was then looked upon as a most dangerous heresy: for which he was thrown into prison by Pope Urban VIII. and not suffered to come out till he had recanted his opinion; that is, till he had renounced the testimony of his senses. He died the 24th of May 1553, in the 70th year of his age.

This extraordinary man had been made canon of Worms by his mother's brother, Lucas Wazelerodius, who was bishop of that place. He was not only the greatest of astronomers, but a perfect master of the Greek and Latin tongues; to all which he joined the greatest

Copernicus
Copy.

greatest piety and innocence of manners.

COPERNICUS, the name of an astronomical instrument, invented by Mr Whiston, to exhibit the motion and phenomena of the planets, both primary and secondary. It is built upon the Copernican system, and for that reason called by his name.

COPHTS, COPHITI, or COPTS, a name given to such of the Christians of Egypt as are of the sect of Jacobites.

The Cophits have a patriarch, who is styled the patriarch of Alexandria, having 11 or 12 bishops under him, but no archbishop. The rest of the clergy, whether secular or regular, are of the order of St Anthony, St Paul, and St Macarius, each of whom have their monasteries. The Cophits have seven sacraments, *viz.* baptism, the eucharist, confirmation, ordination, faith, fasting and prayer.

COPHTIC or COPTIC *Language*, is that spoken by the Cophits, being the ancient language of the Egyptians, intermixed with the Greek, and the characters of it being those of the Greek.

The ancient Coptic is now a dead language, to be met with no where but in books, and those only translations of the scriptures, and of ecclesiastical offices, or others that have a relation thereto; the language now used over all the country being that of the Arabic.

COPPER constitutes a distinct genus of metals, being next to iron in specific gravity, but lighter than gold, silver, or lead. See CHEMISTRY, n^o 141, 200, 241, 278, 332, 370.

Fulminating COPPER. See CHEMISTRY, n^o 333.
Poison of COPPER. See POISON.

COPPERAS, a name given to the factitious green vitriol. See CHEMISTRY, n^o 110.

COPPICE, or COPSE, a little wood, consisting of under-woods, or such as may be raised either by sowing or planting.

COPULATION, the act of generation, or the congress of the male and female, otherwise called *cottion*. See GENERATION.

COPY, in a law sense, a transcript of a writing or instrument, made for the use and satisfaction of some of the parties concerned, or in order to preserve the memory thereof.

COPY is also used for an imitation of any original work; particularly a painting, draught, figure, &c.

COPY, among printers, denotes the manuscript or original of a book given to print from.

COPY-HOLD, a tenure for which a tenant has nothing to show but the copy of the rolls made by the steward of the lord's court.

It is called a base tenure; because the tenant holds the land at the will of the lord. However, it is not simply at the will of the lord, but according to the custom of the manor by which such estate is descendible, and the tenants heirs may inherit it; and a copy-holder, so long as he does his services, and does not break the custom, cannot be ejected by the lord; and if he be, he shall have trespass against him.

COPY-HOLDER, one who is admitted tenant of lands or tenements within a manor, which time out of mind, by use and custom of the manor, have been demisable, and demised to such as will take them in fee-simple or fee-tail, for life, years, or at will, according to the

Copy.

custom of the manor by copy of court-roll; but is generally where the tenant has such estate either in fee or for three lives.

COPY-Right, the right which an author may be supposed to have in his own original literary compositions; so that no other person, without his leave, may publish or make profit of the copies. When a man by the exertion of his rational powers has produced an original work, he has clearly a right to dispose of that identical work as he pleases; and any attempt to take it from him, or vary the disposition he has made of it, is an invasion of his right of property. Now the identity of a literary composition consists entirely in the *sentiment* and the *language*; the same conceptions, clothed in the same words, must necessarily be the same composition: and whatever method be taken of conveying that composition to the ear, or to the eye of another, by recital, by writing, or by printing, in any number of copies, or at any period of time, it is always the identical work of the author which is so conveyed; and no other man (it hath been thought) can have a right to convey or transfer it without his consent, either tacitly or expressly given. This consent may perhaps be tacitly given when an author permits his work to be published without any reserve of right, and without stamping on it any marks of ownership; it is then a present to the public, like the building of a church, or the laying out a new highway; but in case of a bargain for a single impression, or a total sale or gift of the copy-right; in the one case the reversion hath been thought to continue in the original proprietor; in the other the whole property, with its exclusive rights, to be perpetually transferred to the grantee. On the other hand it is urged, that though the exclusive right of the manuscript, and all which it contains, belongs undoubtedly to the owner, *before* it is printed or published; yet from the instant of publication, the exclusive right of an author or his assigns to the sole communication of his ideas immediately vanishes and evaporates; as being a right of too subtle and unsubstantial a nature to become the subject of property at the common law, and only capable of being guarded by positive statute and special provisions of the magistrate.

The Roman law adjudged, that if one man wrote any thing, though ever so elegantly, on the paper or parchment of another, the writing should belong to the original owner of the materials on which it was written: meaning certainly nothing more thereby than the mere mechanical operation of writing, for which it directed the scribe to receive a satisfaction; especially as, in works of genius and invention, such as a picture painted on another man's canvas, the same law gave the canvas to the painter. We find no other mention in the law of any property in the works of the understanding, though the sale of literary copies, for the purposes of recital or multiplication, is certainly as ancient as the times of Terence, Martial, and Statius. Neither with us in Britain hath there been (till very lately) any final determination upon the right of authors at the common law. It was determined in the case of *Miller v. Taylor* in *B. R. Pasch. 9 Geo. III. 1769*, that an exclusive copy-right in authors subsisted by the common law. But afterwards,

Cogrimbo
Corallina.

wards, in the case of *Donaldson v. Bocket*, before the house of lords, which was finally determined 22^d February 1774, it was held that no copy-right subsists in authors, after the expiration of the several terms created by the statute 8 Ann c. 19. This statute declares, that the author and his assigns shall have the whole liberty of printing and reprinting his works for the term of 14 years, and no longer; and also protects that property by additional penalties and forfeitures; directing farther, that if at the end of that term the author himself be living, the right shall then return to him for another term of the same duration.

COQUIMBO, a port-town of Chili, in South America, situated at the mouth of a river of the same name, which discharges itself into the pacific ocean. W. Long. 75. 10. N. Lat. 30. 0.

COR CAROLI, in astronomy, an extraconstellated star in the northern hemisphere, situated between the *coma berenices*, and *ursa major*; so called by Dr Halley in honour of king Charles.

COR HYDRE, a fixed star of the first magnitude, in the constellation of hydra.

COR LEONIS, or **REGULUS**, in astronomy, a fixed star of the first magnitude, in the constellation Leo.

CORACO-BRACHIALIS, in anatomy, the name of a muscle in the arm, serving to raise it upwards.

CORACOIDES, in anatomy, a small sharp process of the scapula. See **ANATOMY**, n^o 46.

CORACOMANTES, in antiquity, persons who foretold events from their observations on crows.

CORALLINA, or **CORAL**, in zoology, a genus belonging to the order of vermes zoophyta. The trunk is radiated, jointed, and calcareous. The species are eight, distinguished by the form of their branches, and are found in the ocean adhering to stones, bones, shells, &c. The corals were formerly believed to be vegetable substances hardened by the air; but are now known to be composed of congeries of animals, which are even endued with the faculty of moving spontaneously.

The islands in the South-sea are mostly coral rocks covered over with earth. The little creatures, which have scarce sensation enough to distinguish them from plants, build up a rocky structure from the bottom of that sea too deep to be measured by human art, till it reaches the surface. Some of these coralline islands appear to be of a much older date than others; particularly the Friendly islands: and it is probable that as these submarine works are continually going on, new islands may by that means frequently be produced.

When coral is newly taken up out of the sea, the small protuberances on its surface are soft, and yield, on being pressed, a milky juice which effervesces with acids. The cortical part with which the coral is all over covered is not near so compact as the internal, and may easily be taken off whilst fresh; and from this part it is usually freed before it comes to the market. The greatest coral trade is in Genoa and Leghorn. The small sprigs unfit for ornamental uses are in the shops levigated into a subtile powder; which, however, has no medicinal virtues superior to the common testacea. Coral is not unfrequently imitated by artificial compositions, some of which are made to resemble it exactly; but the abuse may be discovered

Coral.

by fire, the counterfeit not affording the alkaline earth which is afforded by the genuine coral. The colouring ingredients in the artificial coral are cinabar and minium, both of which are easily discovered. The natural coral seems to receive its colour from iron; for spirit of vitriol acquires from it a ferrugineous taste; and on calcining the coral, some particles are found among the ashes that are attracted by the magnet. Sixteen ounces of coral, according to Neuman, when distilled in an open fire, yield about six scruples and an half of volatile alkaline spirit, with two or three grains of an empyreumatic oil: from the caput mortuum calcined, five scruples and a half of fixed salt may be extracted. In former times, many extraordinary virtues were expected from this substance, on account of its fine red colour; and therefore a great number of methods were tried to extract this colour by means of spirit of wine. None of these, however, succeeded. A red colour was indeed sometimes obtained, but it turned out the same whether any coral was used in the operation or not. In some of these processes, however, the coral loses its colour. One method of making the tincture is by dissolving a pound of sugar in a little water, and then adding half a pound of wax. A pound of coral boiled in this mixture loses its redness, but is found to be unaltered in other respects. In order to prepare the tincture, the wax and sugar must be dissolved in spirit of wine.

CORAL FISHERY. Red coral is found in the Mediterranean, on the shores of Provence, from Cape de la Couronne to that of St Tropez; about the isles of Majorca and Minorca; on the south of Sicily; on the coasts of Africa; and, lastly, in the Ethiopic ocean, about cape Negro. The dyvers says, that the little branches are found only in the caverns whose situation is parallel to the earth's surface, and open to the south. The manner of fishing being nearly the same wherever coral is found, it will suffice to instance the method used at the bastion of France, under the direction of the company established at Marseilles for that fishery. Seven or eight men go in a boat commanded by the patron or proprietor; and when the net is thrown by the cafter, the rest work the vessel, and help to draw the net in. The net is composed of two rafters of wood tied cross-wise, with leads fixed to them: to these they fasten a quantity of hemp twisted loosely round, and intermingled with some large netting. This instrument is let down where they think there is coral, and pulled up again when the coral is strongly intangled in the hemp and netting. For this purpose, six boats are sometimes required; and if in hauling in, the rope happens to break, the fishermen run the hazard of being lost. Before the fishers go to sea, they agree for the price of the coral, which is sometimes more, sometimes less a pound; and they engage, on pain of corporal punishment, that neither they nor their crew shall embezzle any, but deliver the whole to the proprietors. When the fishery is ended, which amounts one year with another to twenty-five quintals for each boat, it is divided into thirteen parts, of which the proprietor hath four, the cafters two, and the other six men one each, the thirteenth belongs to the company for payment of the boat furnished them.

CORALLODENDRON,

Corallo-
dendron
|
Coranich

CORALLODENDRON, in botany. See ERYTHRINA.

CORAM (Captain Thomas), a gentleman remarkably distinguished by his humanity, was born about the year 1668, and spent the early part of his life in the station of master of a vessel trading to our colonies. Afterwards residing in the eastern part of the metropolis, among seafaring people, where business often obliged him to come early into the city and return late, he frequently saw young children exposed in the streets through the indigence or cruelty of their parents. This excited his compassion, and induced him to project the foundation of an hospital for foundlings. In this humane design he laboured with indefatigable diligence for seventeen years; and by his application procured a number of the nobility and gentry to patronize and carry the scheme into execution, and at length obtained the royal charter for it. He was also highly instrumental in promoting the trade of America, by procuring a bounty upon naval stores imported from our colonies. *He was likewise eminently concerned in settling on foot the colonies of Georgia and Nova Scotia. His last charitable design, in which he lived to make some progress, was a scheme for uniting the North American Indians more closely to the British interest, by an establishment for the education of Indian girls. In short, he spent the greatest part of life in labouring for the public, and experienced a fate too common in those who devote their talents to such laudable purposes; being at last indebted for subsistence to the voluntary subscriptions of some public-spirited persons, at the head of whom was the late Frederic Prince of Wales. Captain Coram died in 1751: and was interred, at his own desire, in a vault under the chapel of the Foundling Hospital.

CORAN, or ALCORAN. See ALCORAN.

CORAX, in ornithology, the trivial name of a species of CORVUS.

CORANICH, among the Scotch and Irish, the custom of singing at funerals, anciently prevalent in those countries, and still practised in several parts. Of this custom Mr Pennant gives the following account. "I had not the fortune to be present at any in North Britain; but formerly assisted at one in the south of Ireland, where it was performed in the funerals of horror. The cries are called by the Irish the *ulogohne*, and *hullulu*; two words very expressive of the sound uttered on these occasions; and, being of Celtic stock, etymologists would swear to be the origin of the *υλογαγνη* of the Greeks, and *ululatus* of the Latins. Virgil is very fond of using the last, whenever any of his females are distressed; as are others of the Roman poets, and generally on occasions similar to this. It was my fortune to arrive at a certain town in Kerry at the time that a person of some distinction departed this life: my curiosity led me to the house, where the funeral seemed conducted in the purest classical form.

*Quodcumque aspiceret luctus, gemitusque sonabant,
Formaque non taciti funeris insis erat.*

In short, the *conclamatio* was set up by the friends in the same manner as Virgil describes that consequential of Dido's death;

*Lamentis gemitusque & femineo ululatu
Tecta fremunt.*

Immediately after this followed another ceremony, fully described by Camden in his account of the manners of the ancient Irish; the earnest expostulations and reproaches given to the deceased for quitting this world, where she enjoyed so many blessings, so good a husband, and such fine children. This custom is also of great antiquity, for Eurypylus's mother makes the same address to her dead son.

Tune illa senectæ

*Sera me requies? potuisti relinquere solam
Crudelis?*

But when the time approached for carrying out the corpse, the cry was redoubled,

Tremulis ululatus aethera complent.

a numerous band of females waiting in the outer court to attend the hearle, and to pay in chorus the last tribute of their voices. The habit of this sorrowing train, and the neglect of their persons, were admirably suited to the occasion; their robes were black and flowing, resembling the ancient *Palla*; their feet naked, their hair long and dishevelled: I might truly say,

Ut qui conducti plorant in funera, dicunt

Et faciunt prope plura dolentibus exanimis.

The corpse was carried slowly along the verge of a most beautiful lake, the ululatus was continued, and the whole procession ended among the venerable ruins of an old abbey."

CORBAN, in Jewish antiquity, were those offerings which had life, in opposition to the *minchab*, or those which had not. It is derived from the word *karab*, which signifies "to approach," because the victims were brought to the door of the tabernacle. The corban were always looked upon as the most sacred offerings. The Jews are reproached with defeating, by means of the corban, the precept of the fifth commandment, which enjoins the respect due to parents. For, when a child had no mind to relieve the wants of his father or mother, he would say to them, *It is a gift* (corban) *by whatsoever thou mightest be profited by me, i. e. I have devoted that to God, which you ask of me, and it is no longer mine to give.*

CORBAN is also a ceremony which the Mahometans perform at the foot of mount Ararat, in Arabia, near Mecca. It consists in killing a great number of sheep, and distributing them among the poor.

CORBEILS, in fortification. See BASKET.

CORBEL, in architecture, a representation of a basket, sometimes seen on the heads of the caryatides.

CORBET (Richard), bishop of Norwich, and an eminent poet, was born at Ewell in Surry, toward the latter end of the 16th century; and educated at Oxford, where he was esteemed one of the most celebrated wits of the university. Entering into holy orders, he became a popular preacher, and was made chaplain to king James I.: when, after several preferments in the church, he was, in 1629, made bishop of Oxford; and, in 1632, was translated to the see of Norwich. He was very hospitable, and always a generous encourager of public designs. He died in 1635. There have been several editions of his poems published under the title of *Poemata Stromata*.

CORBET, a town of Picardy in France, with a famous abbey of Benedictine monks. It is seated on the river

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Corbet.

rivar Somme, 10 miles east of Amiens, and 75 north of Paris. E. Long. 2. 35. N. Lat. 49. 55.

CORCELET, in natural history, that part of the fly-clas, which is analogous in its situation to the breast in other animals. Many have called it the breast in these also, but improperly; because the breast of other animals is the place of the lungs and trachea, but these organs are in the fly-clas distributed through the whole body. The wings are affixed to this part of the fly-clas; and there are some distinctions of great consequence in regard to the arrangement and distribution of those animals into genera. Some flies have a double corcelet, or one divided into two parts; and this is the case of the fly produced from the fornica leo, which therefore does not carry its only distinction in the figure of its antennæ. One pair of the legs of this fly are attached to the first or anterior corcelet, which is also capable of moving on the other.

The corcelets of some flies are also much more elevated than those of others; and in some this elevation is carried so far, that the head is forced by it to be bent downward, and the creature is plainly made hump-backed by it. The great kind, and the *tipula*, furnish instances of this elevated and hump-backed corcelet.

A series of flies of two wings are known by a very particular armament which they carry on the corcelet, usually called their *breast*. This consists of two long, slender, sharp-pointed prickles, which are immovable in their insertions, and seem meant as offensive or defensive weapons; but in what manner they are used is not easily to be determined.

All these flies are produced from long water-worms with open and funnel-fashioned tails, or furnished with their aperture for respiration at the hinder extremity. These tails are bordered with hairs, which the creature makes to diverge from their insertion, and form a kind of funnel at the surface of the water, when it throws up its tail for air.

There are three known species of this sort of fly, with armed corcelets, which differ much in size, but are all produced of worms of this kind. The largest of these flies is produced from the largest and longest worm, and are something longer than the bee. The smallest are produced of worms very small and slender, and are themselves extremely minute: and the third kind is of a middle size between these, and produced from a proportionably smaller worm than that of the first, and proportionably larger than that of the second species.

All these species have their wings but little distinguishable at their first production from the shell; they appear indeed only like two slender filaments laid across their bodies: but they quickly flew that in this state they were only very nicely folded together; and soon expanded, and flew their full extent and proportion.

When first produced from the shell, these flies are of a pale green colour. The under part of their belly in many continues green, but in the greater number it becomes of a pale dead brown. Some of them have the outside of their bodies of a deep brown, approaching to black, with lines of a dead brown between the commissures of the rings. The back of some others has only a blackish brown band, which runs straight

down from the corcelet to the end of the body, the whole body beside being of a dead brown. The corcelet in these flies is brown, and the prickles are yellowish near their insertions, but nearly black at their points. They have three of the final glossy eyes disposed in the shape of a triangle on the back part of their head; and their reticular eyes are brown, and at some distance from one another.

CORCULUM, a diminutive from *cor* "the heart," little heart; the essence of a seed, and principle of life of the future plant, attached to and contained within the lobes. It consists of two parts, termed by Linnaeus *PLUMULA* and *ROSTELLUM*. The former is the *radicula* of Grew and other naturalists. The corculum is in fact the embryo of the future vegetable; and is attached by two trunks of vessels to the lobes at their union. The first of its two parts mounts upward, and becomes the trunk. The other strikes into the ground, and is the rudiment of the root. The lobes and heart of the seed are distinctly visible in the bean, and other seeds of that class, especially after remaining some time in water or earth. See *COTYLEDON*, *GERMINATION*, and *VEGETATION*.

The principle of life is seated either at the summit or base of the feed. From this circumstance are constructed the two first classes in Cæsalpinus's method, containing trees and shrubs only.

CORD, or **CHORD**, an assemblage of several threads of hemp, cabled or twisted together by means of a wheel. See *CORDAGE*. The word comes from the Greek *χορδή*, which properly signifies an intestine or gut, of which cords may be made. See *CHORD*.

Magical CORD, an instrument in great use among the Laplanders, and by them supposed to be endued with a number of virtues. It is a cord or rope with three knots tied in it. They use many magical rites and ceremonies in the tying of this cord; and, when thus prepared, it is supposed to have power over the winds; and they will sell, by means of it, a good wind, or at least the promise of one, to a ship. If they untie only one of these knots, a moderate gale succeeds; if two, it is much stronger; and if three, a storm is sure to follow.

CORD of Wood, a certain quantity of wood for burning, so called because formerly measured with a cord. The dimensions of a statute cord of wood are eight feet long, four feet high, and four feet broad.

CORD-WOOD, is new wood, and such as, when brought by water, comes on board a vessel, in opposition to that which is floated.

CORDAGE, a term used in general for all sorts of cord, whether small, middling, or great. See *ROPE*.

The naval cordage of the earlier ages was in all probability only thongs of leather. These primitive ropes were retained by the Caledonians in the third century. The nations to the north of the Baltic had them in the ninth, or tenth centuries. And the inhabitants of the western isles of Scotland make use of them at present: cutting the skin of a seal, or the raw and salted hide of a cow into long pieces, and fastening the plough to their horses with them, or even twisting them into strong ropes of 20 or 30 fathoms length. But these, in the south of our island, and on the continent, were early superseded by the use of iron-chains.

The

Cordage
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Cordial.

The very maritime and commercial nation of the Veneti, that was so intimately connected with the Belge of Britain, used iron chains for their cables in the days of Cæsar. But in the more distant and refined countries of the south, both thongs and these had long given place to the use of vegetable threads, and the arts of combining them into strength. In this manner the Greeks appear to have used the common rushes of their country, and the Carthaginians the *spartum*, or broom of Spain. And as all the cordage of the Romans was made of these materials, at their last descent on our island, to the art of manufacturing them would necessarily be introduced with the Roman settlements among the Britons. Under the direction of Roman artists their thongs of leather would naturally be laid aside, and the junci, or rushes of the plains, worked up into cordage. And what remarkably coincides with this opinion is, that the remains of old cables and ropes are still distinguished among the British sailors by the name of *old junk*.

The nations of Roman Britain, and the tribes of Caledonia and Ireland, had inherited, from their earliest ancestors, many of the ruder arts of navigation. Their ships were large open boats, framed of light timbers ribbed with hurdles, and lined with hides. These were furnished with masts and sails. The latter were formed of hides, as the tackle was of thongs. They were actually of hides among the Veneti as late as the days of Cæsar. And they were never furled, but only bound to the mast. But these slight sea-boats, and their rude furniture, would soon be dismissed by the provincials for the more substantial vessels and more artificial sails of the Romans. The Roman sails, which were composed of flax in the days of Agricola, were afterwards made of hemp; and our own are therefore denominated *cannabis*, or *cannasi*, by our mariners at present. And about the same period assuredly did the junk of the British cordage give way to the same materials; the use of hempen ropes upon land, and of hempen nets for hunting, being very common among the Romans in the first century.

CORDATED, an appellation frequently given by naturalists to things somewhat resembling a heart.

CORDED, in heraldry. A cross corded, some authors take for a cross wound or wrenched about with cords; others, with more probability, take it for a cross made of two pieces of cord.

CORDELERAS, mountains of South America, otherwise called ANDES.

CORDELIER, in church-history, a Franciscan, or religious of the order of St Francis.

CORDEMOI (Géral de), a learned philosopher and historian, born at Paris, made himself known to M. Bossuet, who placed him about the dauphin in the quality of reader. He instructed that young prince with great assiduity; and in 1675 was received into the French academy. He wrote a general history of France during the first races of the French kings, in 2 vols.; and six Discourses on the Distinction between Body and Soul, which were printed together in 1702, in quarto. He died in 1684. M. Cordemoi followed the principles of Descartes.

CORDIAL, in medicine, whatever raises the spirits, and gives them a sudden strength and cheerfulness; as

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wine, spirits, the effluvia of flowers, fruit, and many other substances.

CORDON, in fortification, a row of stones, made round on the outside, and set between the wall of the fortrefs which lies aloope, and the parapet which stands perpendicular, after such a manner, that this difference may not be offensive to the eye; whence the cordons serve only as an ornament, ranging round about the place, being only used in fortification of stone-work. For in those made with earth, the void space is filled up with pointed stakes.

CORDOUA, or CORDOVA, a city of Andalusia in Spain, situated on the river Guadalquivir, in a very extensive plain. The circumference is large; but it is not peopled in proportion to its extent, for there are a great many orchards and gardens within the walls. There are many superb structures, palaces, churches, and religious houses; particularly the cathedral, which is very magnificent: it was formerly a mosque when the Moors possessed the town; for which reason it still retains the name of *Mezquita*, which has the same meaning. The square called the Plaza Major is surrounded with very fine houses, under which are piazzas. The trade is flourishing on account of the river; and consists of wine, silk, and Cordovan leather. In the neighbourhood of this place are a vast number of orange and lemon trees, which renders their fruits exceeding cheap. The best horses in Spain come from hence. W. Long. 3. 47. N. Lat. 37. 42.

NEW CORDUA, a considerable town of South America, in the province of Tucuman, with a bishop's see, 175 miles from St Jago. W. Long. 62. 5. S. Lat. 32. 10.

CORDUAN, a famous pharos or light-house of France, in Guienne, at the mouth of the river Gironde. The architecture is extremely fine; and is placed there to hinder vessels from running on the sand-banks at the mouth of the river. W. Long. 1. 9. N. Lat. 45. 36.

CORDUS (Valerius), a learned botanist, was the son of Eriicus Cordus, a physician and poet of Germany. Having learnt the languages, he applied himself to the study of botany: in the prosecution of which, he examined the mountains of Germany, and travelled into Italy; but, being wounded in the leg by the kick of a horse, died at Rome in 1544. He wrote Remarks on Dioscorides, and other works.

CORDWAINERS, or CORDINERS, the term whereby the statutes denominate *shoemakers*. The word is formed from the French *cordonnier*, which Menage derives from *cordonan*, a kind of leather brought from Cordous, whereof they formerly made the upper-leathers of their shoes. Others derive it from *corde*, "rope," because anciently shoes were made of cords; as they still are in some parts of Spain, under the name of *alpargates*. But the former etymology is better warranted: for, in effect, the French workmen who prepare the cordus are still called *cordonniers*.

In Paris they have two pious societies under the titles of *freres cordonniers*, "brothers shoemakers," established by authority towards the middle of the 17th century; the one under the protection of St Crispin, the other of St Crispianus, two saints who had formerly honoured the profession. They live in community,

Cordon
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Cordwain-
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Corea
|
Corelli.

and under fixed statutes and officers; by which they are directed both in their spiritual and secular concerns. The produce of their shoes goes into a common stock, to furnish necessaries for their support; the rest to be distributed among the poor.

COREA, a peninsula lying to the north-east of China, between 99 and 109 degrees of E. Long. and between 32 and 46 of N. Lat. It is divided into 8 provinces, which contain 40 cities of the 1st rank, 51 of the 2^d, and 70 of the 3^d. The capital of the whole is Hanching, where the king resides. The Jesuits say, the people are well-made, of a sweet and tractable disposition, and fond of learning, music, and dancing, and in general resemble the Chinese. Their houses are mean, being covered with thatch; and they have no beds, but lie on the floor. They have little silk, and therefore make use of linen-cloth in its room. Their arms are cross-bows, and very long sabres or swords. Their trade consists in white paper, pencils, gingfeng, gold, silver, iron, yellow varnish, fowls whose tails are three feet long, horses no more than three feet in height, sable-skins, castor, and mineral salt. In general it is a fertile country, though abounding in mountains. They never bury their dead till three years after their decease, but keep them close shut up in coffins for that time. It is tributary to China.

COREIA, in antiquity, a festival in honour of Proserpine.

CORELLI (Arcangelo), the famous Italian musician and composer, a native of Fusignano, in the territory of Bologna, was born in 1653. He entertained an early propensity to the violin; and, as he advanced in years, laboured incessantly in the practice of that instrument. About the year 1672, his curiosity led him to visit Paris, probably with a view to attend the improvements which were making in music under the influence of cardinal Mazarine, and in consequence of the establishment of a royal academy; but, notwithstanding the character which he brought with him, he was driven back to Rome by Lully, whose jealous temper could not brook so formidable a rival as this illustrious Italian. In the year 1680 he visited Germany, and met with a reception suitable to his merit from most of the German princes, particularly the elector of Bavaria; in whose service he was retained, and continued for some time. After about five years stay abroad, he returned again to Rome, and there pursued his studies with great assiduity.

The proficiency of Corelli on his favourite instrument the violin was so great, that the fame of it reached throughout Europe. The style of his performance was learned, elegant, and pathetic; and his tone firm and even. Mr Geminiani, who was well acquainted with, and had studied it, was used to resemble it to a sweet trumpet. A person who had heard him perform says, that, whilst he was playing on the violin, it was usual for his countenance to be distorted, his eyes to become as red as fire, and his eye-balls to roll as in an agony.

Corelli was highly favoured by that great patron of poetry and music, cardinal Ottoboni. Crescembini says, that he regulated the musical academy held at the palace of his eminence every Monday afternoon.

Corelli.

Here it was that Mr Handel became acquainted with him; and in this academy a serenata of Mr Handel, intitled, *Il Triosfo del Tempo*, was performed, the overture to which was in a style so new and singular, that Corelli was confounded in his first attempt to play it.

During the residence of Corelli at Rome, besides those of his own country, many persons were ambitious of becoming his disciples, and learning the practice on the violin from the greatest master of that instrument the world had then heard of. Of these it is said the late lord Edgecumbe was one; and that the fine mezzotinto print of Corelli by Smith, was scraped from a picture painted by Mr Hugh Howard at Rome for that nobleman.

Corelli died at Rome in 1713; and was buried in the church of the Rotunda, otherwise called the Pantheon, in the first chapel, on the left hand of the entrance. Over the place of his interment is a sepulchral monument to his honour, with a marble bust thereon, erected at the expence of Philip-William, count palatine of the Rhine, under the care and direction of cardinal Ottoboni.

For many years after his decease, this excellent musician was commemorated by a solemn musical performance in the Pantheon, on the anniversary of his death. In the year 1730 an eminent master, now living, was present at that solemnity, who relates that at it the third and eighth of his concertos were performed by a numerous band, among whom were many who had been the pupils of the author. He adds, that these two pieces were performed in a slow, distinct, and firm manner, without graces, and just as they are wrote; and from hence concludes, that this was the manner in which they were played by the author himself.

He died possessed of about 6000 l. sterling. He was a passionate admirer of pictures, and lived in an uninterrupted friendship with Carlo Cignani and Carlo Marat: these two eminent painters were rivals for his favour; and for a series of years presented him at times with pictures, as well of other masters as of their own painting. The consequence was, that Corelli became possessed of a large and valuable collection of original paintings; all which, together with the sum above-mentioned, he bequeathed to his dear friend and patron cardinal Ottoboni, who, reserving the pictures to himself, generously distributed the rest of the effects among the relations of the testator.

Corelli is said to have been remarkable for the mildness of his temper and the modesty of his deportment: nevertheless he was not insensible of the respect due to his skill and exquisite performance. Ciber, in the Apology for his Life, p. 340. relates, that when he was playing a solo at cardinal Ottoboni's, he discovered the cardinal and another person engaged in discourse, upon which he laid down his instrument, and being asked the reason, gave for answer, that he feared the music interrupted their conversation.

The compositions of Corelli are celebrated for the harmony resulting from the union of all the parts; but the fineness of the airs is another distinguishing characteristic of them: the allemand in the 10th solo is as remarkable for spirit and force, as that in the

Coreopsis
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Corfu.

11th is for its enchanting delicacy: his jigs are in a style peculiarly his own; and that in the 5th solo was never equalled. In the gavot-movements in the 2^d and 4th operas, the melody is distributed with great judgment among the several parts. In his minuets alone he seems to fail; Bononcini, Mr Handel, and Giuseppe Martini, have excelled him in this kind of airs.

It is said there is in every nation a style both in speaking and writing, which never becomes obsolete; a certain mode of phraseology, so consonant and congenial to the analogy and principles of its respective language, as to remain settled and unaltered. This, but with much greater latitude, may be said of music; and accordingly it may be observed of the compositions of Corelli, not only that they are equally intelligible to the learned and unlearned, but that the impressions made by them have been found to be as durable in general. His music is the language of nature; and, for a series of years, all that heard it became sensible of its effects: of this there cannot be a stronger proof than that, amidst all the innovations which the love of change had introduced, it continued to be performed, and was heard with delight in churches, in theatres, at public solemnities and festivities, in all the cities of Europe for near 40 years. Men remembered, and would refer to passages in it as to a classic author; and even at this day, the masters of the science do not hesitate to pronounce of the compositions of Corelli, that, of fine harmony and elegant modulation, they are the most perfect exemplars.

COREOPSIS, TICKSEED SUNFLOWER; a genus of the syngenesia order, belonging to the polygamia frustanea class of plants. There are 11 species, most of them herbaceous perennials. They are very flowery, and rise from three to eight feet stature; terminated by clusters of compound radiated flowers of a yellow colour. They have all perennial fibrous roots and annual stalks, which rise in the spring, flower from July to October, and decay to the root in November. The flowers are all shaped like sun-flowers, but smaller, and are very ornamental. They are easily propagated by slipping or dividing the roots in autumn, when the stalks decay; planting the slips at once where they are to remain; after which they will require no farther trouble than to be kept free from weeds, and have the decayed stalks cut annually in autumn.

CORFE-CASTLE, a borough-town in Dorsetshire in England. It takes its name from a strong castle, belonging to the crown, that stood there, but is now ruined. W. Long. 2. 8. N. Lat. 50. 33.

CORFU, an island in the Ionian sea, at the mouth of the gulf of Venice, formerly called *Corcyra* and *Phœcia*, famous for the gardens of Alcinoüs. It belongs at present to the Venetians; and forms the bulwark of Christendom against the Turks, who have often attempted to reduce it but without success. It is well fortified, and has 50 castles; and the number of the inhabitants is said to be about 50,000. The inhabitants are of the Greek church; and the Venetians send them a governor and magistrates, which are changed every two years. The soil is very fruitful, and produces a great deal of wine, olives, and several

other fruits, particularly figs, which are exceedingly good. The chief city is likewise called *Corfu*; see the following article.

CORFU, a city of the island of that name, belonging to the Venetians. It is a large place; and is well fortified with walls to the south, where there are two fortresses, one to the east, and another to the west. There are no fortifications on the side of the haven, nor are they necessary. Here the Venetian general of the Levant resides, under whom are the providors of Zante, Cephalonia, &c. The inhabitants of this city are said to be very revengeful, never forgiving an injury; and hence quarrels among them are hereditary. There is always a garrison here of 4000 men. E. Long. 19. 48. N. Lat. 39. 50.

CORIA, a town of Spain, in the kingdom of Leon and province of Eltramadur, towards the confines of Portugal, with a bishop's see. It is seated on a little river called *Alagon*, in a very fertile plain. There is nothing remarkable but the cathedral church, except at a little distance a river without a bridge, and a bridge without a river. This was caused by an earthquake, which turned the river another way. W. Long. 6. 46. N. Lat. 39. 59.

CORIANDRUM, CORIANDER; a genus of the digynia order, belonging to the pentandria class of plants: There are only two species, both of them herbaceous annuals, the leaves of which are useful for the kitchen, and the seeds for medicine. Both species have divided small leaves, somewhat resembling parsley: but there is but one species generally cultivated; namely, the *sativum*. This hath a small, fibrous white root, crowned by many parted leaves, having broadish segments; and in the centre an upright, round, branchy stalk, two feet high, having all the branches terminated by umbels of flowers, which are succeeded by globular fruit. It is propagated by seed, which when a good crop is wanted, ought to be sown in March either in drills a foot asunder, or by broad-cast, and then raked in. When the plants are an inch or two high, they should be hoed to six or eight inches distance. The seeds when fresh have a strong disagreeable smell, which improves by drying, and becomes sufficiently grateful: they are recommended as carminative and stomachic. The leaves are sometimes used for culinary purposes in soups, and as an ingredient in salads; but as they are of a fetid smell, they are held in no great esteem in this country.

CORIARIA, the *Tanner's*, or *Myrtle-leaved SUMACH*; a genus of the decandria order, belonging to the diœcia class of plants. There are two species, the myrtifolia and the fœmina. They are both natives of the south of France, but the former is most commonly cultivated in this country. It is a pretty ornamental plant, with a shrubby, pithy brown stem, closely branching from the bottom, and forms a bushy head three or four feet over, thickly garnished with oblong, pointed, bright green leaves, having small spikes of whitish flowers at the ends of the branches. It is easily propagated by suckers from the root, which it affords plentifully, and may be taken off with fibres every autumn or winter. It may be also propagated by layers in autumn, which will take root in a year. It is much used in the south of France, where it natu-

Corfu
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Coriaria.

Corinna
Corinth.

rally grows, for tanning of leather, whence its name of tanner's smutch. It also dyes a beautiful black colour. The berries are dangerous, and when eaten generally occasion vertiges and epilepsies. The old leaves have the same effect upon cattle that eat them, but the young leaves are innocent.

CORINNA, a Grecian lady, celebrated for her beauty and poetic talents, was born at Theffu a city of Boeotia, and was the disciple of Myrtis another Grecian lady. Her verses were so esteemed by the Greeks, that they gave her the name of the lyric muse. She lived in the time of Pindar, about 495 years before Christ; and is said to have gained the prize of lyric poetry from that poet: but Pausanias observes that her beauty made the judges partial.

CORINTH, a celebrated city of antiquity, for some time the most illustrious of all the Greek cities. It is said to have been founded 1514 years before Christ, by Sisyphus the son of Eolus, and grandfather of Ulysses. Various reasons are given for its name, but most authors derive it from *Corinthus* the son of Pelops. It was situated in the fourth part of the Isthmus which joins the Peloponnesus, now the Morea, to the continent. It consisted of a citadel built upon an eminence, and thence named *Acrocorinthus*; besides which it had two maritime towns subject to it, named *Lecheum* and *Cenchrea*. The whole state extended scarce half a degree in length or breadth; but so advantageously were the above-mentioned ports situated, that they might have gained the Corinthians a superiority, if not a command, over all Greece, had not their advantageous situation inclined them to commerce rather than war. For their citadel was almost impregnable; and, commanding both the Ionian and Egean seas, they could easily cut off all communication from one half of Greece with the other; for which reason this city was called, one of the fetters of Greece.

But as the genius of the Corinthians led them to commerce rather than martial exploits, their city became the finest in all Greece. It was adorned with the most sumptuous buildings, as temples, palaces, theatres, porticoes, &c. all of them enriched with a beautiful kind of columns, which from the city were called *Corinthian*. But though the Corinthians seldom or never engaged in a war with a view of enlarging, but rather of defending, their little state, they did not forget to cultivate a good discipline both in time of peace and of war. Hence many brave and experienced generals have been furnished by Corinth to the other Grecian cities, and it was not uncommon for the latter to prefer a Corinthian general to any of their own.

This city continued to preserve its liberty till the year before Christ 146, when it was pillaged and burnt by the Romans. It was at that time the strongest place in the world; but the inhabitants were so disheartened by a preceding defeat, and the death of their general, that they had not presence of mind enough even to shut their gates. The Roman consul, Mummius, was so much surprised at this, that at first he could scarce believe it; but afterwards fearing an ambuscade, he advanced with all possible caution. As he met with no resistance, his soldiers had nothing to do but destroy the few inhabitants who had not fled, and plan-

der the city. Such of the men as had staid, were all put to the sword, and the women were sold for slaves. After this the city was rankled by the greedy soldiers, and the spoils of it are said to have been immense. There were more vessels of all sorts of metal, more fine pictures, and statues done by the greatest masters, in Corinth, than in any other city in the world. All the princes of Europe and Asia, who had any taste in painting and sculpture, furnished themselves here, with their richest moveables: here were cast the finest statues for temples and palaces, and all the liberal arts brought to their greatest perfection. Many inestimable pieces of the most famous painters and statuary fell into the hands of the ignorant soldiers, who either destroyed them or parted with them for a trifle. Polybius the historian was an eye-witness to this barbarism of the Romans. He had the mortification to see two of them playing at dice on a famous picture of Arifides, which was accounted one of the wonders of the world. The piece was a *Bacchus*, so exquisitely done, that it was proverbially said of any extraordinary performance, "it is as well done as the *Bacchus of Arifides*." This masterly piece of painting, however, the soldiers willingly exchanged for a more convenient table to play upon: but when the spoils of Corinth were put up to sale, Attalus king of Pergamus offered for it 600,000 sesterces, near 5000 l. of our money. Mummius was surprised at such a high price offered for a picture, and imagined there must be some magical virtue in it. He therefore interposed his authority, and carried it to Rome, notwithstanding the complaints of Attalus. Here this famous picture was lodged in the temple of Ceres, where it was at last destroyed by fire, together with the temple. Another extraordinary instance of the stupidity of Mummius is, that when the pictures were put on board the transports, he told the masters of the vessels very seriously, that if any of the things were either lost or spoiled, he would oblige them to find others at their own cost; as if any other pieces could have supplied the loss of those inestimable originals, done by the greatest masters in Greece. When the city was thoroughly pillaged, fire was set to all the corners of it at the same time. The flames grew more violent as they drew near the centre, and at last uniting there made one prodigious conflagration. At this time the famous metalline mixture is said to have been made, which could never afterwards be imitated by art. The gold, silver, and brass, which the Corinthians had concealed, were melted, and ran down the streets in streams, and when the flames were extinguished, a new metal was found, composed of several different ones, and greatly esteemed in after ages. The walls of the city were then demolished, and rased to the foundation; but the city was rebuilt again by Julius Cæsar, and made a Roman colony. It continued subject to the Roman emperors till the division of the empire, after which it fell to the share of those of Constantinople. On the decline of that empire it fell to the Venetians, but was taken from them by Mohammed II. The Venetians retook it in 1678; but the Turks became masters of it again in 1715, and have kept it ever since. It is now greatly decayed; for the houses are not contiguous, but intermixed with fields

Corinth.

and

Corinth
Coris.

and gardens, which make it look like a village. The country about it abounds with corn, wine, and oil; and from its cattle, is one of the finest prospects in the world, over the sea to the east and west, and a fertile country to the north and south. The narrowest part of the isthmus, on which it stands, is above six miles over. There are still to be seen the ruins of the temples dedicated to the Sun, Pluto, Diana, Neptune, Ceres, and Bacchus. The inhabitants are most of them Christians, of the Greek church, who are allowed liberty of conscience by the Turks. E. Long. 28. 13. N. Lat. 38. 14.

CORINTH, (the isthmus of), in the Morea, is a neck of land which joins the Morea to Greece, and reaches from the gulph of Lepanto to that of Egina. Julius Cæsar, Caligula, and Nero, attempted to cut a channel through it, but in vain; and they therefore afterwards built a wall across it, which they called Hexamilium, because it was six miles in length. This was demolished by Amurat II. and afterwards rebuilt by the Venetians, but was levelled a second time by Mahomet II.

CORINTHIAN, in general, denotes something belonging to Corinth: thus we say, Corinthian brags, Corinthian order, &c.

CORINTHIAN Order, in architecture, the fourth order of architecture, according to Scamozzi; but Mr le Clerc makes it the fifth, being the most noble and delicate of all the other five. See ARCHITECTURE, n^o 52.

CORIO (Bernardine), an historian born of an illustrious family at Milan, in the year 1460. He was secretary of state to that duchy; and the duke of Lavis Storza appointed him to write the history of Milan. He died in 1500. The best edition of his history is that of 1503, in folio. It is printed in Italian, and is very scarce.

CORIOLANUS (C. Marcius), a famous Roman captain, took Corioli a town of the Volsci, whence he had his surname: at last, disgusting the people, he was banished Rome by the tribune Decius. He went to the Volsci, and, persuading them to take up arms against the Romans, they encamped within four miles of the city. He would not listen to proposals of peace till he was prevailed upon by his wife Veturia, and his mother Volumnia, who were followed by all the Roman ladies in tears. He was put to death by the Volsci as a traitor that had made them quit their conquest: upon which the Roman ladies went into mourning; and in the same place where his blood was spilled, there was a temple consecrated to feminine virtue.

CORIS, in botany, a genus of the monogynia order belonging to the pentandria class of plants, for which there is no English name. There is only one species, viz. the *montpellierensis*, or blue maritime coris. There are two varieties of this plant, one with a red, and the other with a white flower; but these are only accidental, and arise from the same seeds. They grow wild about Montpellier, and in most places in the south of France: they seldom grow above six inches high, and spread near the surface of the ground like heath; and in June, when they are full of flowers, make a very pretty appearance. They may be propagated by sowing their seeds in a bed of fresh earth, and afterwards removing the young plants, some into pots,

and others into a warm border. They generally bear our winter colds well enough, but severe frosts will sometimes destroy them; for which reason it is proper to keep some of them in pots, which should be put under a hot-bed frame in winter. As they seldom produce good seeds in this country, they may, in want of these, be propagated by slips and cuttings, which will take root if planted on a very gentle hot-bed, shaded from the sun and duly watered.

CORISPERMUM, TICKSEED, a genus of the digynia order belonging to the monandria class of plants. There are two species; but none of them are remarkable for their beauty or any other quality.

CORK, or CORK-TREE, in botany. See QUERCUS. Fossil-CORK, a name given to a kind of stone. It seems to be a species of amianthus, consisting of flexible fibres loosely interwoven, and somewhat resembling vegetable cork. It is the lightest of all stones; by fire it is fusible, and forms a black glass. It possesses the general qualities of amianthus. See that article.

CORK, in Latin *comitatus Corcagensis*, a county of the province of Munster in Ireland. It is the most populous and considerable county of the kingdom next to that of Dublin; containing near a million of acres, and being divided into 15 baronies. It is bounded on the east by the county of Waterford; on the west by the ocean; by Limerick on the north; and by the Vergivian sea on the south and south-east. Including Desmond it is 85 miles in length, and 50 in breadth; but is very unequal both ways. Though a considerable part of the country is boggy, mountainous, and barren; yet by the industry of the inhabitants it is pretty well cultivated and improved, and contains several good towns and harbours.

CORK, a city of Ireland, and capital of the county of that name. It is an episcopal see; and is the largest and most populous of any in the kingdom, Dublin alone excepted. It is situated on the river Lee, 15 miles from its mouth, and is a place of great trade. Though smaller vessels can come up to the key, yet the larger generally ride at a place called *passage*. The houses in general are well built, but many of the streets are too narrow. Its churches are unexceptionably the neatest and most elegantly finished of any in the kingdom. This city, together with its liberties, makes a county. It was built, or rather fortified, by the Danes, in the ninth century. The greatest part of it stands on a marshy island surrounded by the river Lee, which also runs through the city, and divides it into several canals. On this account some have thought the air very moist and unwholesome. Complaints have also been made against the water as impure; but, from comparing the bills of mortality with those of other cities, it appears that the city of Cork is far from being unhealthy. This hath been accounted for from the influx of the tide, by which a stagnation of air is prevented. The first charter of Cork was bestowed by Henry III. and afterwards ratified by Edward I. Edward II. and Edward III. Edward IV. granted a new charter; and the city received many favours from the succeeding monarchs. King James I. gave the citizens a new and ample charter; and king Charles I. what is called the Great Charter, by which, among others, a clause in king James's charter was enforced, making
this

Corispermum
Cork.

Cork
Cormandel.

this city a county of itself. Though a garrison, it was never a place of much strength, as appeared at the revolution. It was then reduced in a short time by Marlborough; and the troops that were then in it, to the number of 4 or 5000, made prisoners of war. The last royal charter was granted in 1735, by which all the aldermen that had passed the chair were empowered to act as justices of peace. The inhabitants in general are active and industrious; carrying on various manufactures, and a great inland trade, especially for live cattle. But the wealth and grandeur of Cork arises chiefly from its excellent harbour, where almost any number of ships may lie with safety. According to some accounts, in times of peace, 1200 vessels have been known to resort to this harbour in a year. Ships from England, bound to all parts of the West Indies, take in here a great part of their provisions; and on the same account the haven of Cork is visited by those of most other nations. The merchants of Cork carry on a very extensive foreign trade, which is daily increasing. Vast quantities of salt beef are exported from this place. The slaughtering season continues from the month of August to the end of January; during which space it has been computed that they kill seldom fewer than 100,000 head of black cattle. The rest of their exports consist of butter, candles, hides raw and tanned, linen-cloth, pork, calves, lambs, and rabbit-skins, tallow, wool for England, linen and woolen yarn, worsted, &c. Notwithstanding all this, however, the city of Cork is exposed to some inconveniences from its situation, particularly to inundations. It is situated in W. Long. 8. 25. N. Lat. 51. 40.

CORK JACKET, or **Waiscoat**, is an invention of one Mr Dubourg, a gentleman very fond of swimming, but subject to the cramp, which led him to consider of some method by which he might enjoy his favourite diversion with safety. The waiscoat is composed of four pieces of cork, two for the breasts, and two for the back; each pretty near in length and breadth to the quarters of a waiscoat without flaps; the whole is covered with coarse canvas, with two holes to put the arms through: there is a space left between the two back pieces, and the same betwixt each back and breast piece, that they may fit the easier to the body. Thus the waiscoat is open only before, and may be fastened on the wearer with strings, or, if it should be thought more secure, with buckles, and leather straps. This waiscoat does not weigh above 12 ounces, and may be made up for about 5 or 6 shillings expence. Mr Dubourg tried his waiscoat in the Thames, and found that it not only supported him on the water, but that two men could not sink him, though they used their utmost efforts for that purpose. If those who use the sea occasionally, and especially those who are obliged to be almost constantly there, were to have those waiscoats, it would be next to impossible that they should be drowned. It would also be of vast service to those that, for the sake of health, bathe in the sea; and even the most delicate and timorous young lady might by the help of one of these jackets venture into a rough sea. See **AIR-JACKET**, and **BAMBOO-HABIT**.

CORMANDEL. See **COROMANDEL**.

CORMORANT, a corruption of *Corvorant*, in or- **Cormorant**
nithology. See **PILICANUS**.

CORN, in country affairs, the grain or seeds of plants separated from the spike, or ear, and used for making bread.

There are several species of corn, such as wheat, rye and barley, millet and rice, oats, maize and lentils, pease, and a number of other kinds, each of which has its usefulness and propriety. Corn is very different from fruits, with respect to the manner of its preservation; and is capable of being preserved in public granaries, for pressing occasions, and of being kept for several centuries.

The first method is to let it remain in the spike; the only expedient for conveying it to the islands and provinces of America. The inhabitants of those countries save it in the ear, and raise it to maturity by that precaution: but this method of preserving it, is attended with several inconveniences among us; corn is apt to rot or sprout, if any the least moisture is in the heap; the rats likewise infest it, and our want of straw also obliges us to separate the grain from the ear. The second is to turn out and winnow it frequently; or to pour it through a trough or mill-hopper, from one floor to another; being thus moved and aired every 15 days, for the first 6 months, it will require less labour for the future, if lodged in a dry place: but if, through neglect, mites should be allowed to slide into the heap, they will soon reduce the corn to a heap of dust: this must be avoided by moving the corn anew, and rubbing the places adjacent with oils and herbs, whose strong odour may chase them away; for which garlic and dwarf-elder are very effectual: they may likewise be exposed to the open sun, which immediately kills them. When the corn has been preserved from all impurities for the space of two years, and has exhaled all its fires, it may be kept for 50 or even 100 years, by lodging it in pits covered with strong planks, closely joined together: but the safer way is to cover the heap with quick-lime, which should be dissolved by sprinkling it over with a small quantity of water; this causes the grains to shoot to the depth of two or three fingers; and incloses them with an incrustation, through which neither air nor insects can penetrate.

Corn not exceeding the under-mentioned prices have the following bounties per quarter, viz.

	Price per q ^r .		Bounty per q ^r .	
	l.	s.	s.	d.
Wheat	2	8	5	0
Rye	1	12	3	6
Barley and Malt	1	4	2	6
Oat-meal	0	15	2	6

In France corn of the growth of the kingdom is reckoned a contraband commodity.

Indian CORN or maize. See **ZEAL**.

CORN-Butterfly, method of destroying it. See **AGRICULTURE**, n^o 76.

CORN-Grass. See **RALLUS**.

CORN-Mill, a water-engine for grinding of corn. See **MECHANICS**.

CORN, in medicine and surgery, a hard tubercle like a flat wart, growing in several parts of the feet, especially

Corn
||
Corneille.

cially upon the joints of the toes. See (*Index* subjoined to) *MEDICINE*.

CORN, in farriery. See *FARRIERY*, § xliii.

CORNAGE, an ancient tenure, the service whereof was to blow a horn when any invasion of the Scots was perceived. This tenure was very frequent in the northern counties near the Picts wall.

CORNARIUS, or HAGUENBOT, (John), a celebrated German physician, born at Zwickow, in Saxony. His preceptor made him change his name of Haguenbot to that of Cornarius, under which he is most known. At 20 years of age he taught grammar, and explained the Greek and Latin poets and orators to his scholars; and at 23, was licentiate in medicine. He found fault with most of the remedies provided by the apothecaries; and observing, that the greatest part of the physicians taught their pupils only what is to be found in Avicenna, Rasis, and the other Arabian physicians, he carefully sought for the writings of the best physicians of Greece, and employed about 15 years in translating them into Latin, especially the works of Hippocrates, Aëtius, Eginetes, and a part of those of Galen. Meanwhile he practised physic with reputation at Zwickow, Francfort, Marburg, Nordhausen, and Gena, where he died of an apoplexy in 1558, aged 58. He also wrote some medicinal treatises; published editions of some poems of the ancients on medicine and botany; and translated some of the works of the fathers, particularly those of Basil, and a part of those of Epiphanius.

CORNARO (Lewis), a Venetian of noble extraction, memorable for having lived healthful and active to above 100 years of age by a rigid course of temperance. By the ill conduct of some of his relations he was deprived of the dignity of a noble Venetian; and seeing himself excluded from all employments under the republic, he settled at Padua. In his youth, he was of a weak constitution; and by irregular indulgence reduced himself, at about 40 years of age, to the brink of the grave, under a complication of disorders; at which extremity he was told that he had no other chance for his life, but by becoming sober and temperate. Being wise enough to adopt this wholesome counsel, he reduced himself to a regimen of which there are very few examples. He allowed himself no more than 12 ounces of food, and 14 ounces of liquor each day; which became so habitual to him, that when he was above 70 years of age, the experiment of adding two ounces to each by the advice of his friends, had like to have proved fatal to him. At 83, he wrote a treatise which has been translated into English, and often printed, intitled, *Sure and certain Methods of attaining a Long and Healthful Life*; in which he relates his own story, and extols temperance to a degree of enthusiasm. At length, the yolk of an egg became sufficient for a meal, and sometimes for two, until he died with much ease and composure in 1566. The writer of the *Spectator*, N° 195, confirms the fact from the authority of the Venetian ambassador at that time, who was a descendant of the Cornaro family.

CORNEA TUNICA. See *ANATOMY*, n° 406. c.

CORNEILLE (Peter), a celebrated French poet, was born at Rouen, in the year 1606. He was

brought up to the bar, which he attended for some little time; but, formed with a genius too elevated for such a profession, and having no turn for business, he soon deserted it. An affair of gallantry occasioned his writing his first piece, intitled, *Mélite*; which had prodigious success. Encouraged by the applause of the public, he wrote the *Cid*, and the other tragedies that have immortalized his name. In his dramatic works he discovers a majesty, a strength and elevation of genius, scarce to be found in any other of the French poets; and, like our immortal Shakespeare, seems better acquainted with nature, than with the rules of critics. Corneille was received into the French academy in 1647, and died dean of that academy in 1784, aged 78. Besides his dramatic pieces, he wrote a translation, in French verse, of the "Imitation of Jesus Christ," &c. The best edition of his works is that of 1682, in 4 vols 12^{mo}.

CORNEILLE (Thomas), brother of the former, was a member of the French academy, and of that of inscriptions. He discovered in his youth a great inclination to poetry; and at length published several dramatic pieces, in five volumes duodecimo, some of which were applauded by the public, and acted with success. He also wrote, 1. A translation of Ovid's *Metamorphoses*, and of some of Ovid's *Epistles*. 2. *Remarks on Vauglas*. 3. *A Dictionary of Arts*, two volumes folio; and, 4. *An universal, geographical, and historical Dictionary*, in three volumes folio.

CORNEILLE (Michael), a celebrated painter, was born at Paris, in the year 1642; and was instructed by his father, who was himself a painter of great merit. Having gained a prize at the academy, young Corneille obtained a pension from Lewis XIV.; and was sent to Rome, where that prince had founded a school for young artists of genius. Having studied there some time, he gave up his pension, and applied to the antique with great care. He is said to have equalled Carache in drawing; but in colouring he was deficient. Upon his return from Rome, he was chosen professor in the academy of Paris; and was employed by the above prince in all the great works he was carrying on at Versailles and Trianon, where are still to be seen some noble efforts of his genius.

CORNEL-TREE, in botany. See *CORNUS*.

CORNELIAN. See *CARNELIAN*.

CORNER, in a general sense, the same with *ANGLE*.

CORNET, in the military art of the ancients, an instrument much in the nature of a trumpet; which when it only sounded, the ensigns were to march alone, without the soldiers; whereas, when the trumpet only sounded, the soldiers were to move without the ensigns. The cornets and buccinæ sounded the charge and retreat; and the cornets and trumpets sounded during the course of the battle.

CORNET, in the military art of the moderns, the third commission-officer in a troop of horse or dragoons.

This is a very honourable post: he commands in the lieutenant's absence; his principal duty being to carry the standard, near the middle of the first rank of the squadron.

CORNEUS, the name by which Linnæus calls a kind

Corneille:
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Cornus.

Corniche
&
Cornus.

kind of *tin-ore*, found in black columns, with irregular sides, and terminating in prisms.

CORNICHE, CORNISH, or CORNICE, in architecture, the uppermost member of the entablature of a column, as that which crowns the order. See ARCHITECTURE, Chap. I. and the Plates.

CORNICHE, is also used, in general, for all little projectures in masonry or joinery, even where there are no columns, as the corniche of a chimney, beautiful, &c.

CORNICHE-Ring, a piece of ordnance, is that next from the muzzle-ring, backward.

CORNISH DIAMOND. See DIAMOND.

CORNICULARIUS, in Roman antiquity, an officer of the army, appointed to assist the military tribune in quality of lieutenant.

CORNIX, in ornithology, the trivial name of a species of *CORVUS*.

CORNU. See HORN.

CORNU Ammonis, in natural history, fossil shells, called also *serpent-stones*, or *snake-stones*.

They are found of all sizes, from the breadth of a sixpence, to more than two feet in diameter; some of them rounded, others greatly compressed, and lodged in different strata of stones and clays; some again are smooth, and others ridged in different manners, their striz and ridges being either straight, irregularly crooked, or undulated. See SNAKE-STONE.

CORNU Cervi. See HARTSHORN.

CORNUCOPIA, or HORN OF PLENTY, among painters, &c. is represented under the figure of a large horn, out of which issue fruits, flowers, &c. Upon medals the cornucopia is given to all deities, genii, and heroes, to mark the felicity and abundance of all the wealth procured by the goodness of the former, or the care and valour of the latter.

CORNUS, CORNEL-TREE, CORNELIAN CHERRY, or DOG-WOOD; a genus of the monogynia order, belonging to the tetrandria class of plants.

Species. Of this genus there are five species; the most remarkable are the following. 1. The mas, or cornelian cherry-tree, hath an upright tree-stem, rising 20 feet high, branching, and forming a large head, garnished with oblong leaves, and small umbels of yellowish-green flowers at the sides and ends of the branches, appearing early in the spring, and succeeded by small, red, cherry-like, eatable, acid, fruit. 2. The sanguinea, bloody-twigg, or common dog-wood; hath an upright tree-stem, branching 10 or 12 feet high, having blood-red shoots, garnished with oblong pointed nervous leaves two inches long; and all the branches terminated by umbellate white flowers succeeded by black berries, of this there is a kind with variegated leaves. 3. The florida, or Virginian dog-wood, hath a tree-stem branching 12 or 15 feet high, and fine red shoots garnished with large heart-shaped leaves; and the branches terminated by umbellate white flowers, having a large involucre succeeded by dark red berries. Of this species there are several varieties, chiefly distinguished by the colour of their berries, which are red, white, or blue.

Culture. All the species may be propagated by seeds, which ought to be sown in autumn, otherwise they will lie a year in the ground. When the plants

come up, they should be duly watered in dry weather, and kept clean from weeds. The following autumn they may be transplanted into the nursery; and having remained there two or three years, they may then be removed to the places where they are to remain. They may also be propagated by suckers, of which they produce great plenty, or by laying down the young branches.

CORNUTIA, in botany, a genus of the digynia order, belonging to the triandria class of plants. There is but one species, viz: the pyramidata, with a blue pyramidal flower, and hoary leaves. It grows plentifully in several of the islands of the West-Indies, also at Campeachy, and at La Vera Cruz. It rises to the height of 10 or 12 feet, with rude branches, the leaves being placed opposite. The flowers are produced in spikes at the end of the branches, and are of a fine blue colour. They usually appear in autumn, and will sometimes remain in beauty for two months or more. It is propagated either by seeds or cuttings, and makes a fine appearance in the stove; but is too tender to bear the open air in this country.

CORNWAL, the most westerly county of England, bounded by the English channel on the south, St George's channel on the west, the Bristol channel on the north, and on the east by the river Tamar, which separates it from Devonshire. Its name is supposed by some to be compounded of *corn*, signifying "a rock" in the British language, and *Gaulis*, or *Wales*, the name the Saxons gave to the Britons. Others, however, think it is derived from the Latin *cornu*, the name the British kern, "a horn;" on account of its running out into the sea somewhat in the form of a horn. It is computed to be 70 miles in length, 40 in breadth where broadest, and not five in the narrowest part. Dr Campbell, however, in his Political Survey of Great Britain, is of opinion that this county is much larger than our accounts commonly make it. In respect of size, he thinks it is equal at least to the duchy of Parma; and but little, if at all, inferior to the island of Majorca. There is a tradition in this county with regard to its former extent, which Dr Campbell is also inclined to believe, namely, that there was anciently a tract of ground called the *Liones*, extending towards the Scilly islands, but now covered with water. At present, Cornwall contains 21 parliamentary boroughs; 27 market towns; between 12 and 1300 villages, and upwards of 120,000 inhabitants.

As Cornwall is surrounded by the sea on all sides except the east, its climate is somewhat different from that of the other parts of Britain. The reasons of this difference will be easily understood from what is observed concerning the climate of America*. The summers in Cornwall are less hot, and the winters less cold, than in other parts of England, and the spring and harvest are observed to be more backward. High and sudden winds are also more common in this than in other counties of England. The county is rocky and mountainous; but the mountains are rich in metals, especially tin and copper. The valleys are very pleasant and fertile, yielding great plenty both of corn and pasture. The lands near the sea-coast are manured and fertilized with sea-weed, and a kind of sand formed by the particles of broken shells as they are dashed

Cornuth
I
Cornwal.

* See America, n^o 3.
—24.

Cornwal
Corollary.

dafted againft each other by the fea. Here are great plenty of copper, tin, and lead mines, moor-ftones, lapis calaminaris for making brafs, cornifh diamonds, and a yellow ore called *mundick*, whence copper and lapis calaminaris are extracted. Cattle of all forts are fmaller here than in the other counties of England; and the wool of the fheep, which are moftly without horns, is very fine, and the flefh, both of them and of the black cattle, extremely delicate. The country is well fupplied with fifh from the fea and the many rivers with which it is watered. The moft noted of the fea-fifh is the pilchard; of which prodigious quantities are caught from July to November, and exported to different parts, efpecially to Spain. It is faid that a million have been fometimes taken at a fingle draught. The natives are remarkable for their ftrength and activity, as well as their dexterity in wrrelling, in which exercife the Cornifh hug is highly extolled.

The tin dug from the Cornifh mines is melted into pigs of three or four hundred weight, each of which is ftamped with the owner's name. There are five towns, Lefkard, Leftwithel, Truro, Helton, and Penzance, where the tin is effayed and marked at Midfummer and Michaelmas, or Lady-day and Chriftnas, with the feal of the duchy of Cornwal. When it is thus marked, and the duty of four fhillings for every hundred weight paid, the tinner may difpofe of it as he pleafes; only the king, or duke of Cornwal, are to have the preference, if they chufe to be purchafers. The caufes arifing among the tinner are tried by juries, returned by the mayors of the ftannary or coinage towns, before the lord-warden or his deputy. They have had many privileges beftowed upon them by the kings and dukes of Cornwal, in confideration of the high duty they pay, and for encouraging them in their laborious and difagreeable bufinefs of mining. Ever fince Edward III. created his eldeft fon duke of Cornwal, the eldeft fons of the kings of England have enjoyed that title. They have royal prerogatives and privileges in the duchy, fuch as the nomination of its fheriff, a right to the duty on tin, wrecks, cuftoms, &c. Though this county is much inferior to fome others in point of populoufnefs and wealth, particularly Yorkfhire and Middlefex, yet it fends a far greater number of members to parliament, *viz.* 44, which is nearly equal to the number fent from Scotland, and double to that fent from Wales. This great difproportion, fo dangerous to the conftitution, is attributed to the partiality of the kings, on account of the great revenue they received from it, or to the intereft of its ancient dukes. Of the boroughs which fend members to parliament, fome are fo inconfiderable as to have no church.

COROLLA, among botanifts, the moft confpicuous part of a flower, furrounding the organs of generation, and compofed of one or more flower-leaves, moft commonly called *petals*, to diftinguifh them from the leaves of the plant; according as there is one, two, or three of thefe petals, the corolla is faid to be monopetalous, dipetalous, tripetalous, &c.

COROLLARY is a confequence drawn from fomething already advanced or demonftrated: thus, it being demonftrated that a triangle which has two equal fides, has alfo two angles equal; this corollary will follow, that a triangle which has three

fides equal, has alfo its three angles equal.

COROLLISTÆ, a name by which Linnæus diftinguifhes thofe fyftematic botanifts who have arranged vegetables from the regularity, figure, number, and other circumftances, of the petals, or beautiful coloured leaves of the flower. The beft fyftems of this kind are thofe of Rivinus and Tournefort. The former proceeds upon the regularity and number of the petals; the latter, with much more certainty, on their regularity and figure.

COROLLULÆ, a term ufed by botanifts to exprefs the little partial flowers which make up the compound ones.

COROMANDEL, the eaftern coaft of the peninfula on this fide the Ganges in Afia. It is bounded on the north by Golconda, on the eaft by the bay of Bengal, on the fouth by Madura, and on the weft by Bifnagar. This coaft fo much refembles that of Orixá, that the Abbé Raynal choofes to confider them as one, and gives to both the general name of *Coromandel*. Here an exceffive heat reigns from the beginning of May to the end of October. It begins at nine in the morning, and continues till nine in the evening. During the night it is allayed by a fea-breeze from the fouth-eaft; and moft commonly this refrefhing gale begins at three in the afternoon. The air is lefs inflamed during the reft of the year, though in all feafons it is very hot. It rains almoft continually during the months of November and December. This immense traël is covered with a parched fand for the extent of two miles, and fometimes only one mile along the coaft.

This country was at firft neglected by the Europeans for many reafons. It was feparated by inacceffible mountains from Malabar, where thefe bold adventurers endeavoured to fettle themfelves. Spices and aromatics, which were the principal objects of their attention, were not to be found there. In fhort, civil diffentions had banifhed from it tranquillity, fecurity, and induftry. At that period the empire of Bifnagar, to which this vaft country was fubject, was falling to ruin. The governments of Vifapour, the Carnatic, Golconda, and Orixá, threw off their dependence, and affumed the title of kings. Thofe of Madura, Tanjore, Myfore, Glngi, and fome others, likewise ufurped the fovereign authority, though they retained their ancient title of *Naick*. This revolution had juft happened when the Europeans appeared on the coaft of Coromandel. The foreign trade was at that time inconfiderable; it confifted only of diamonds from Golconda, which were carried to Calicut and Surat, and from thence to Ormus or Suez, whence they were circulated through all Europe and Afia. Mafulipatan, the richeft and moft populous city of thefe countries, was the only market that was known for linens; they were purchafed at a great fair annually holden there by the Arabian and Malayan veffels that frequented that bay, and by caravans arrived from diftant parts. The linens were exported to the fame places with the diamonds. The fondnefs for the manufactures of Coromandel which began to prevail here, infpired all the European nations trading to the Indian feas with the refolution of forming fettlements there. They were not difcouraged either by the difficulty of conveying goods from the inland parts of the

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country, where there was no navigable river; by the total want of harbours, where the sea at one season of the year is not navigable; by the barrenness of the coasts, for the most part uncultivated and uninhabited; nor by the tyranny and fluctuating state of the government. They thought that silver would be industriously fought after; that Pegu would furnish timber for building, and Bengal, corn for subsistence; that a prosperous voyage of nine months would be more than sufficient to complete their ladings; and that by fortifying themselves they should be secure against the attacks of the weak tyrants that oppressed these countries.

The first European colonies were established near the shore. Some of them obtained a settlement by force; most of them were formed with the consent of the sovereigns; and all were confined to a very narrow tract of land. The boundaries of each were marked out by a hedge of thorny plants, which was their only defence. In process of time fortifications were raised; and the security derived from them, added to the lenity of the government, soon increased the number of colonists. The splendor and independence of these settlements several times raised the jealousy of the princes in whose dominions they were formed; but their attempts to demolish them proved abortive. Each colony increased in prosperity in proportion to the riches and the wisdom of the nation that founded it. None of the companies that exercised an exclusive privilege beyond the Cape of Good Hope had any concern in the trade of diamonds. This was always left to private merchants, and by degrees fell entirely into the hands of the English, or the Jews and Armenians that lived under their protection. At present this grand object of luxury and industry is much reduced. The revolutions that have happened in Indostan have prevented people from resorting to these rich mines; and the anarchy in which this unhappy country is plunged, leaves no room to hope that they will be again attended to. The whole of the commercial operations on the coast of Coromandel is confined to the purchase of cottons. The manufacturing of the white cottons bought there, differs so little from ours, that it would be neither interesting nor instructive to enter into a minute description of it. The process used in making their printed cottons, which was at first servilely followed in Europe, has since been rendered more simple, and brought to greater perfection by our manufacturers. The painted cottons which are bought there, we have not yet attempted to imitate. Those who imagine we have been prevented from undertaking this branch merely by the high price of labour among us, are mistaken. Nature has not given us the wild fruits and drugs necessary for the composition of those bright and indelible colours which constitute the principal merit of the Indian manufactures; nor has she furnished us with the waters that serve to fix them. The Indians do not universally observe the same method in painting their cottons; either because there are some niceties peculiar to certain provinces, or because different soils produce different drugs for the same uses. We should tire the patience of our readers were we to trace the slow and painful progress of the Indians in the art of

painting their cottons. It is natural to believe that they owe it to length of time, rather than to the fertility of their genius. What seems to authorize this conjecture is, that they have stopped in their improvements, and have not advanced a single step in the arts for many ages; whereas we have proceeded with amazing rapidity. Indeed, were we to consider only the want of invention in the Indians, we should be tempted to believe, that, from time immemorial, they have received the arts they cultivate from some more industrious nation; but when it is remembered that these arts have a peculiar dependence on the materials, gums, colours, and productions of India, we cannot but be convinced that they are natives of that country. It may appear somewhat surprising that cottons painted with all sorts of colours should be sold at so moderate a price, that they are almost as cheap as those that have only two or three. But it must be observed, that the merchants of the country sell to all the companies a large quantity of cottons at a time; and that the demand for cottons painted with various colours makes but a small article in their assortments, as they are not much esteemed in Europe.

Though cottons of all sorts are in some degree manufactured throughout the whole country of Indostan, which extends from Cape Comorin to the banks of the Ganges; it is observable, that the fine sorts are made in the eastern part, the common ones in the centre, and the coarse ones in the most western parts. Manufactures are established in the European colonies, and upon the coast: they are more frequent at the distance of five or six leagues from the sea, where cotton is more cultivated, and provisions are cheaper. The purchases made there are carried 30 or 40 leagues farther into the country. The Indian merchants settled in the European factories have always the management of this business. The quantity and quality of the goods wanted are settled with these people: the price is fixed according to the patterns; and, at the time a contract is made, a third, or a fourth part of the money agreed on is advanced. This arrangement is owing to the necessity these merchants themselves are under of advancing money to the workmen by the partners or agents who are dispersed through the whole country; of keeping a watchful eye upon them, for fear of losing what they have advanced; and of gradually lessening the sum, by calling for the cottons as fast as they are worked off. Without these precautions, nothing could be depended on in an oppressive government, where the weaver cannot work on his own account, either because his circumstances will not permit, or because he dares not venture to discover them for fear of exactions. The companies that have either success, or good management, constantly keep the stock of one year in advance in their settlements. By this method they are sure of having the quantity of goods they have occasion for, and of the quality they choose, at the most convenient time; not to mention that their workmen, and their merchants, who are kept in constant employment, never leave them. Such nations as want money and credit cannot begin their mercantile operations till the arrival of their ships. They have only five or six months at most to execute the orders sent from Europe. The goods

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goods are manufactured and examined in haste; and they are even obliged to take such as are known to be bad, and would be rejected at any other time. The necessity they are under of completing their cargoes, and fitting out their vessels before hurricanes come on, leaves no room for nicety of inspection. It would be a mistake to imagine that the country agents could be prevailed upon to order goods to be made on their account, in hopes of selling them with a reasonable advantage to the company with whom they are engaged. For, besides that the generality of them are not rich enough to embark in so large an undertaking, they would not be certain of finding their account in it. If the company that employ them should be hindered by unforeseen accidents from sending the usual number of ships, these merchants would have no vent for their commodities. The Indians, the form of whose dress requires different breadths and lengths from those of the cottons fabricated for our use, would not purchase them; and the other European companies would be provided, or certain of being provided, with whatever the extent of their trade required, and their money enabled them to purchase. The plan of procuring loans, which was contrived to remedy this inconvenience, never has, nor can be useful. It has been a custom, time immemorial, in Indostan, for every citizen who borrows money, to give a written instrument to his creditor. This deed is of no force in a court of judicature, unless it is signed by three witnesses, and bears the day of the month, and the year when it was made, with the rate of interest agreed upon by the parties. If the borrower fails to fulfil his engagements, he may be arrested by the lender himself. He is never imprisoned, because there is no fear of his making his escape. He would not even eat, without obtaining leave of his creditor. The Indians make a three-fold division of interest: one kind they call *vice*; another neither *vice* nor *virtue*; and a third, they say, is *virtue*. The first is four *per cent.* a month; the second two; and the third one. The last is, in their opinion, an act of beneficence that only belongs to the most heroic minds. Yet, though the Europeans, who are forced to borrow, meet with this treatment, it is plain they cannot avail themselves of the indulgence without being involved in ruin.

The foreign trade of Coromandel is not in the hands of the natives. In the western part, indeed, there are Mohammedans known by the name of *Chalias*, who, at Naour, and Porto-Nuovo, send out ships to Acken, Merguy, Siam, and the Eastern coast. Besides vessels of considerable burden employed in these voyages, they have smaller embarkations for the coasting trade for Ceylon; and the pearl fishery. The Indians of Maffulipatan turn their attention another way. They import from Bengal white calicoes which they dye or print, and sell them again at the places from whence they had them, at 35 or 40 *per cent.* advantage. Excepting these transactions which are of very little consequence, the whole trade is vested in the Europeans, who have no partners but a few Banians and Armenians settled in their colonies. The quantity of calicoes exported from Coromandel to the different ports of India, may be computed at 3500 bales.

Of these the French carry 800 to Malabar, Mocha, and the isle of France; the English, 1200 to Bombay, Malabar, Sumatra, and the Philippine Islands; and the Dutch 1500 to their different settlements. Except 500 bales destined for Manila, each of the value of 100 guineas, the others are of such an ordinary kind that they do not exceed 30 guineas at prime cost; so that the whole number of bales do not amount to more than about L. 150,000.

Coromandel furnishes Europe with 9500 bales; 800 of which are brought by the Danes, 2500 by the French, 3000 by the English, and 3200 by the Dutch. A considerable part of these calicoes are dyed blue, or striped blue and red for the African trade. The others are fine muslins, printed calicoes, and handkerchiefs from Maffulipatan, or Pallacate. It is proved by experience that each of these bales costs only about L. 42 Sterling; consequently they ought to bring in to the manufactory where they are wrought, near L. 360,000. The payments are not entirely made in specie, either in Europe or Asia; we give in exchange, cloths, iron, lead, copper, coral, and some other articles of less value. On the other hand, Asia pays with spices, pepper, rice, sugar, corn, and dates. All these articles taken together may amount to about L. 210,000; and from this calculation it follows, that Coromandel receives annually from Europe about L. 300,000 in money. The British who have acquired the same superiority on this coast that they have elsewhere, have formed on it several settlements.

CORONA, among anatomists, denotes that edge of the glans penis, where the preputium begins.

CORONA, or *Halo*, in optics, a luminous circle, surrounding the sun, the moon, the planets, or fixed stars. Sometimes these circles are white, and sometimes coloured, like the rainbow. Sometimes one only is visible, and sometimes several concentric coronas make their appearance at the same time. Those which have been seen about Sirius and Jupiter were never more than three, four, or five degrees in diameter; those which surround the moon are, also, sometimes no more than three or five degrees; but these, as well as those which surround the sun, are of very different magnitudes, *viz.* of 12° 0', 22° 35', 30° 0', 38° 0', 41° 2', 45° 0', 46° 24', 47° 0', and 90°, or even larger than this. Their diameters also sometimes vary during the time of observation, and the breadths both of the coloured and white circles are very different, *viz.* of 2, 4, or 7 degrees.

The colours of these coronas are more dilute than those of the rainbow; and they are in a different order, according to their size. In those which Newton observed in 1692, they were in the following order, reckoning from the inside. In the innermost were blue, white, and red; in the middle were purple, blue, green, yellow, and pale red; in the outermost, pale blue, and pale red. Mr Huygens observed red next the sun, and a pale blue outwards. Sometimes they are red on the inside, and white on the outside. M. Weidler observed one that was yellow on the inside, and white on the outside. In France, one was observed in 1683, the middle of which was white; after which followed a border of red; next to it was blue, then green, and the outermost circle was a bright red.

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red. In 1728, one was seen of a pale red outwardly, then followed yellow, and then green, terminated by white.

These coronas are very frequent. In Holland, M. Muschenbroeck says, so may be seen in the day-time, almost every year; but they are difficult to be observed, except the eye be so situated, that not the body of the sun, but only the neighbouring parts of the heavens can be seen. Mr Middleton says, that this phenomenon is very frequent in North America; for that there is generally one or two about the sun every week, and as many about the moon every month. Halos round the sun are very frequent in Russia. M. Äpinus says, that, from the 23^d of April 1758, to the 20th of September, he himself had observed no less than 26, and that he has sometimes seen twice as many in the same space of time.

Coronas may be produced by placing a lighted candle in the midst of steam in cold weather. Also, if glass windows be breathed upon, and the flame of a candle be placed some feet from it, while the spectator is also at the distance of some feet from another part of a window, the flame will be surrounded with a coloured halo. And if a candle be placed behind a glass receiver, when air is admitted into the vacuum within it, at a certain degree of density, the vapour with which it is loaded will make a coloured halo round the flame. This was observed by Otto Guericke. In December 1756, M. Muschenbroeck observed that, when the glass windows of his room were covered with a thin plate of ice on the inside, the moon appearing through it was surrounded with a large and variously coloured halo; and, opening the window, he found that it arose entirely from that thin plate of ice, for none was seen except through it.

Similar, in some respects, to the halo, was the remarkable appearance which M. Bouguer describes, as observed by himself and his companions, on the top of Mount Pichinca, in the Cordilleras. When the sun was just rising behind them, so as to appear white, each of them saw his own shadow projected upon it, and no other. The distance was such, that all the parts of the shadow were easily distinguishable, as the arms, the leg, and the head; but what surprised them most, was, that the head was adorned with a kind of glory, consisting of three or four small concentric crowns, of a very lively colour, each exhibiting all the varieties of the primary rainbow, and having the circle of red on the outside. The intervals between these circles continued equal, though the diameters of them all were constantly changing. The last of them was very faint, and, at a considerable distance was another great white circle, which surrounded the whole. As near as M. Bouguer could compute, the diameter of the first of these circles was about $5\frac{1}{2}$ degrees, that of the second 11, that of the third 17, and so on; but the diameter of the white circle was about 76 degrees. This phenomenon never appeared but in a cloud consisting of frozen particles, and never in drops of rain, like the rainbow. When the sun was not in the horizon, only part of the white circle was visible, as M. Bouguer frequently observed afterwards.

Similar also to this curious appearance, was one that was observed by Dr McFait in Scotland. This

gentleman observed a rainbow round his shadow in the mist, when he was upon an eminence above it. In this situation the whole country round seemed, as it were, buried under a vast deluge, and nothing but the tops of distant hills appeared here and there above the flood; so that a man would think of diving down into it with a kind of horror. In those upper regions the air, he says, is at that time very pure and agreeable to breath in. At another time he observed a double range of colours round his shadow in these circumstances. The colours of the outermost range were broad and very distinct, and every where about two feet distant from the shadow. Then there was a darkish interval, and after that another narrower range of colours, closely surrounding the shadow, which was very much contracted. This person seems to think that these ranges of colours are caused by the inflection of the rays of light, the same that occasioned the ring of light which surrounds the shadows of all bodies, observed by M. Maraldi, and this author*. But the prodigious variety with which these appearances are exhibited seems to shew that many of them do not result from the general laws of reflexion, refraction, or inflection, belonging to transparent substances of a large mass; but upon the alternate reflexion and transmission of the different kinds of rays, peculiar to substances reduced to the form of thin plates, or consisting of separate and very minute parts. But where the dimensions of the coronas are pretty constant, as in the usual and larger halo, which is about half the diameter of the rainbow, they may, perhaps, be explained on the general principles of refraction only.

Descartes observes, that the halo never appears when it rains: from which he concludes that this phenomenon is occasioned by the refraction of light in the round particles of ice, which are then floating in the atmosphere; and though these particles are flat when they fall to the ground, he thought they must be protuberant in the middle, before their descent; and according to this protuberance he imagined that the diameter of the halo would vary.—In treating of meteors, Gassendi supposed that a halo is the same thing with the rainbow, the rays of light being in both cases twice refracted and once reflected within each drop of rain or vapour, and that all the difference there is between them arises from their different situation with respect to the observer. For, whereas, when the sun is behind the spectator, and consequently the rainbow before him, his eye is in the centre of the circle; when he views the halo, with his face towards the sun, his eye is in the circumference of the circle; so that, according to the known principles of geometry, the angle under which the object appears in this case, must be just half of what it is in the other. Though this writer lays a great deal upon the subject, and endeavours to give reasons why the colours of the halo are in a different order to those of the rainbow, he does not describe the progress of the rays of light from the sun to the eye of the spectator when a halo is formed by them, and he gives no figures to explain his ideas.

Dechales, also, endeavours to show that the generation of the halo is similar to that of the rainbow. If, says he, a sphere of glass or crystal, AB, full of water,

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* *Edinb. Essays*,
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Fig. 1. n° 1.

water, be placed in the beams of the sun shining from C, there will not only be two circles of coloured light, on the side next the sun, and which constitute the two rainbows; but there will also be another on the opposite to the sun, the rays belonging to which meeting at E, afterwards diverge, and form the coloured circle G, as will be visible, if the light that is transmitted through the globe be received on a piece of white paper. The colours also will appear to an eye placed in any part of the surface of the cone FEG. Measuring the angle FEH, he found it to be 23 degrees. They were only the extreme rays of this cone that were coloured like those of the rainbow.

This experiment he thought sufficiently illustrated the generation of the halo; so that whenever the texture of the clouds is such, as not entirely to intercept the rays of the sun or moon, and yet have some degree of density, there will always be an halo round them, the colours of the rainbow appearing in those drops which are 23 degrees distant from the sun or moon. If the sun be at A, and the spectator in B, the halo will be the circle DFE, DBE being 46 degrees, or twice 23.

The reason why the colours of the halo are more dilute than those of the rainbow, he says, is owing principally to their being formed not in large drops of rain, but in very small vapour; for if the drops of water were large, the cloud would be so thick, that the rays of the sun could not be regularly transmitted through them; and, on the other hand, he had observed, that when the rainbow is formed by very thin vapours, the colours hardly appear. As for those circles of colours which are sometimes seen round candles, it was his opinion that they are owing to nothing but moisture on the eye of the observer; for that he could never produce this appearance by means of vapour only, if he wiped his eyes carefully; and he had observed that such circles are visible to some persons and not to others, and to the same persons at one time and not another.

The most considerable of all the theories respecting halos, and that which has met with most favourable and the longest reception, is that of Mr Huygens. Sir Isaac Newton mentions it with respect, and Dr Smith, in his Complete system of Optics, does not so much as hint at any other. The occasion of M. Huygens publishing his thoughts on this subject, was the appearance of a halo at Paris, on the 12th of May 1667, of which he gave an account in a paper read at the Royal Academy in that city, which was afterwards translated, and published in the English Philosophical transactions, and which may be seen in Lowthorp's Abridgment, Vol. 2, p. 189. But this article contains nothing more than the heads of a discourse, which he afterwards composed, but never quite finished, on this subject; and which has been translated, with some additions, by Dr Smith, from whom the following account is chiefly extracted.

Our philosopher had been first engaged to think particularly upon this subject, by the appearance of five suns at Warfaw, in 1658; presently after which, he says, he hit upon the true cause of halos, and not long after of that of mock suns also.

To prepare the way for the following observations,

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it must be remarked, that if we can conceive any kind of bodies in the atmosphere, which, according to the known laws of optics, will, either by means of reflection or refraction, produce the appearance in question, when nothing else can be found that will do it, we must acquiesce in the hypothesis, and suppose such bodies to exist, even though we cannot give a satisfactory account of their generation. Now, two such bodies are affirmed by Mr Huygens; one of them a round ball, opaque in the centre, but covered with a transparent shell; and the other is a cylinder, of a similar composition. By the help of the former he endeavours to account for halos, and by the latter for those appearances which are called mock suns. Those bodies which Mr Huygens requires, in order to explain these phenomena, are not, however, a mere assumption; for some such, though of a larger size than his purpose requires, have been actually found, consisting of snow within, and ice without. They are particularly mentioned by Descartes.

The balls with the opaque kernel, which he supposed to have been the cause of them, he imagines not to exceed the size of a turnip-seed; but, in order to illustrate this hypothesis, he gives a figure of one, of a larger size, in ABCD, EF, representing the kernel of snow in the middle of it. If the rays of light, coming from GH, fall upon the side AD, it is manifest they will be so refracted at A and D, as to bend inwards; and many of them will strike upon the kernel EF. Others, however, as GA, and HD, will only touch the sides of the kernel; and being again refracted at B and C, will emerge in the lines BK, CK, crossing each other in the point K, whose nearest distance from the globe is somewhat less than its apparent diameter. If, therefore, BK and CK be produced towards M and L, (fig. 1. n° 4.) it is evident that no light can reach the eye placed within the angle LKM, but may fall upon it when placed out of that angle, or rather the cone represented by it.

For the same reason, every other of these globules will have a shadow behind it, in which the light of the sun will not be perceived. If the eye be at N, and that be conceived to be the vertex of a cone, the sides of which NR, NQ, are parallel to the sides of the former cone KL, KM, it is evident that none of the globules within the cone QNR, can send any rays of the sun to the eye at N. But any other globe out of this cone, as X, may send those rays, which are more refracted than XZ, to the eye; so that this will appear enlightened, while those within the cone will appear obscure. It is evident from this, that a certain area, or space, quite round the sun, must appear dark; and that the space next to this area will appear luminous, and more so in those parts that are nearest to the obscure area; because, he says, it may easily be demonstrated, that those globules which are nearest to the cone QNR exhibit the largest image of the sun. It is plain, also, that a corona ought to be produced in the same manner, whatever be the sun's altitude, because of the spherical figure of the globules.

To verify this hypothesis, our philosopher advises us to expose to the sun a thin glass bubble, filled with water, and having some opaque substance in the centre of it; and he says we shall find, that we shall not be

Fig. 1. n° 3.

be able to see the sun through it, unless at a certain distance from a place opposite to the centre of it; but as soon as we do perceive the light, the image of the sun will immediately appear the brightest, and coloured red, for the same reason as in the rainbow.

These coronas, he says, often appear about the moon; but the colours are so weak as to appear only white. Such white coronas he had also seen about the sun, when the space within them appeared scarce darker than that without. This he supposes to happen when there are but few of those globules in the atmosphere: for the more plentiful they are, the more lively the colours of the halo appear; at the same time also the area within the corona will be the darker. The apparent diameter of the corona, which is generally about 45 degrees, depends upon the size of the dark kernel; for the larger it is with respect to the whole globe, the larger will be the dark cone behind it.

The globules that form these halos, Mr Huygens supposes to have consisted of soft snow, and to have been rounded by continual agitation in the air, and thawed on their outsides by the heat of the sun.

To make the diameter of the halo 45 degrees, he demonstrates that the semi-diameter of the globe must be to the semi-diameter of the kernel of snow very nearly as 1000 to 480; and that to make a corona of 100 degrees, it must be as a 1000 to 680.

Mr Weidler, in his Commentary on parhelia, published at Wirtemburg in 1738, observes that it is very improbable that such globules as Mr Huygens' hypothesis requires, with nuclei of such a precise proportion, should exist; and if there were such bodies, he thinks they would be too small to produce the effects ascribed to them. Besides, he observes that appearances exactly similar to halos are not uncommon, where fluid vapours alone are concerned; as when a candle is placed behind the steam of boiling water in frosty weather, or in the midst of the vapour issuing copiously from a bath, or behind a receiver, when the air is so much rarefied as to be incapable of supporting the water it contains. The rays of the sun twice reflected and twice refracted within small drops of water are sufficient, he says, without any opaque kernel, to produce all the appearances of the halos that have the red light towards the sun, as may be proved by experiment. That the diameter of the halo is generally half of that of the rainbow, he accounts for as Cassendi did before him.

M. Mariotte accounts for the formation of the small coronas by the transmissiion of light through aqueous vapours, where it suffers two refractions, without any intermediate reflection. He shews that light which comes to the eye, after being refracted in this manner, will be chiefly that which falls upon the drop nearly perpendicular; because more rays fall upon any given quantity of surface in that situation, fewer of them are reflected with small degrees of obliquity, and they are not so much scattered after refraction. The red will always be outermost in these coronas, as consisting of rays which suffer the least refraction. And whereas he had seen, when the clouds were driven briskly by the wind, halos round the moon, varying frequently in their diameter, being sometimes of

two, sometimes of three, and sometimes of four degrees; sometimes also being coloured, sometimes only white, and sometimes disappearing intirely; he concluded that all these variations arose from the different thickness of the clouds, through which sometimes more and sometimes less light was transmitted. He supposed, also, that the light which formed them might sometimes be reflected, and at other times refracted. As to those coronas which consist of two orders of colours, he imagined that they were produced by small pieces of snow, which when they begin to dissolve, form figures which are a little convex towards their extremities. Sometimes, also, the snow will be melted in different shapes; and in this case, the colours of several halos will be intermixed, and confused; and such, he says, he had sometimes observed round the sun.

M. Mariotte then proceeds to explain the larger coronas, namely those that are about 45 degrees in diameter, and for this purpose he has recourse to equiangular prisms of ice, in a certain position with respect to the sun; and he takes pains to trace the progress of the rays of light for this purpose: but this hypothesis is very improbable. In some cases he thought that these large coronas were caused by hail-stones, of a pyramidal figure; because, after two or three of them had been seen about the sun, there fell the same day several such pyramidal hail-stones. M. Mariotte explains parhelia by the help of the same suppositions. See PARHELIA.

Sir Isaac Newton does not appear to have given any particular attention to the subject of halos, but he has hinted at his sentiments concerning them occasionally; by which we perceive that he considered the larger and less variable appearances of this kind as produced according to the common laws of refraction, but that the less and more variable appearances depend upon the same cause with the colours of thin plates.

He concludes his explication of the rainbow with the following observation on halos and parhelia. "The light which comes through drops of rain by two refractions, without any reflexion, ought to appear the strongest at the distance of about 26 degrees from the sun, and to decay gradually both ways as the distance from him increases. And the same is to be understood of light transmitted through spherical hail-stones: and if the hail be a little flatted, as it often is, the transmitted light may be so strong, at a little less distance than that of 26 degrees, as to form a halo about the sun or moon; which halo, as often as the hail-stones are duly figured, may be coloured, and then it must be red within by the least refrangible rays, and blue without by the most refrangible ones; especially if the hail-stones have opaque globules of snow in their centres to intercept the light within the halo, as Mr Huygens has observed, and make the inside of it more distinctly defined than it would otherways be. For such hail-stones, though spherical, by terminating the light by the snow, may make a halo red within, and colourless without, and darker within the red than without, as halos use to be. For of those rays which pass close by the snow, the red-making ones will be the least refracted, and so come to the eye in the straightest lines."

Some farther thoughts of Sir Isaac Newton's on the subject of halos we find subjoined to the account of his experiments on the colours of thick plates of glass, which he conceived to be similar to those which are exhibited by thin ones. "As light reflected by a lens quick-silvered on the back side makes the rings of the colours above described, so (he says), it ought to make the like rings in passing through a drop of water. At the first reflexion of the rays within the drop, some colours ought to be transmitted, as in the case of a lens, and others to be reflected back to the eye. For instance, if the diameter of a small drop or globule of water be about the 500th part of an inch, so that a red-making ray, in passing through the middle of this globule, has 250 fits of easy transmission within the globule, and all the red-making rays which are at a certain distance from this middle ray round about it have 249 fits within the globule, and all the like rays at a certain farther distance round about it have 248 fits, and all those at a certain farther distance 247 fits, and so on, these concentric circles of rays, after their transmission, falling on a white paper, will make concentric rings of red upon the paper; supposing the light which passes through one single globule strong enough to be sensible, and in like manner the rays of other colours will make rings of other colours. Suppose now that in a fair day the sun should shine through a thin cloud of such globules of water or hail, and that the globules are all of the same size, the sun seen through this cloud ought to appear surrounded with the like concentric rings of colours, and the diameter of the first ring of red should be $7\frac{1}{2}$ degrees, that of the second $10\frac{1}{2}$, that of the third $12^{\circ} 33'$, and according as the globules of water are bigger or less, the ring should be less or bigger."

This curious theory our author informs us was confirmed by an observation which he made in 1692. He saw by reflexion, in a vessel of stagnating vessel, three halos, crowns, or rings of colours about the sun, like three little rainbows concentric to his body. The colours of the first, or innermost crown, were blue next the sun, red without, and white in the middle, between the blue and red. Those of the second crown were purple and blue within, and pale red without, and green in the middle. And those of the third were pale blue within, and pale red without. These crowns inclosed one another immediately, so that their colours proceeded in this continual order from the sun outward; blue, white, red; purple, blue, green, pale yellow, and red; pale blue, pale red. The diameter of the second crown, measured from the middle of the yellow and red on one side of the sun, to the middle of the same colour on the other side, was $9\frac{1}{2}$ degrees, or thereabouts. The diameters of the first and third he had not time to measure; but that of the first seemed to be about five or six degrees, and that of the third about twelve. The like crowns appear sometimes about the moon. For in the beginning of the year 1664, on February 19th at night, he saw two such crowns about her. The diameter of the first, or innermost, was about three degrees, and that of the second about five degrees and a half. Next about the moon was a circle of white; and next about that the inner crown, which was of a bluish green within,

next the white, and of a yellow and red without; and next about these colours were blue and green on the inside of the outer crown, and red on the outside of it.

At the same time there appeared a halo at the distance of about $22^{\circ} 35'$ from the centre of the moon. It was elliptical; and its long diameter was perpendicular to the horizon, verging below farthest from the moon. He was told that the moon has sometimes three or more concentric crowns of colours encompassing one another next about her body. The more equal the globules of water or ice are to one another, the more crowns of colours will appear, and the colours will be the more lively. The halo, at the distance of $22\frac{1}{2}$ degrees from the moon, is of another sort. By its being oval, and more remote from the moon below than above, he concludes that it was made by refraction in some kind of hail or snow floating in the air in an horizontal posture, the refracting angle being about 50 or 60 degrees. Dr Smith, however, makes it sufficiently evident, that the reason why this halo appeared oval, and more remote from the moon towards the horizon, is a deception of sight, and the same with that which makes the moon appear larger in the horizon.

Dr Kotelnihow, having, like Dr Halley, made very accurate observations to determine the number of possible rainbows, considered the coloured halo which appears about a candle as the same thing with one of these bows which is formed near the body of the sun, but which is not visible on account of his excessive splendor.

Lastly, M. Muschenbroeck concludes his account of coronas with observing, that some density of vapour, or some thickness of the plates of ice, divides the light in its transmission through the small globules of water, or their interstices, into its separate colours: but what that density was, or what was the size of the particles which composed the vapour, he could not pretend to determine.

CORONA, among botanists, the name given by some to the circumference or margin of a radiated compound flower. It corresponds to the *radius* of Linnæus; and is exemplified in the flat, tongue-shaped petals which occupy the margin of the daisy or sun-flower.

CORONA Borealis, the northern crown, or garland, in astronomy, a constellation of the northern hemisphere, whose stars in Ptolemy's catalogue are eight, in Tycho's as many, and in Mr Flamsteed's 21.

CORONA Imperialis, in conchology, a name given by some authors to a kind of *voluta*, differing from the other shells of that family, by having its head ornamented with a number of points, forming a sort of crown. See *VOLUTA*.

CORONA Imperialis, in botany. See *FRITILLARIA*.

CORONA Solis, in botany. See *HELIANTHUS*.

CORONAL, in anatomy, the first suture of the skull. See *ANATOMY*, n^o 10, g.

CORONALE os, the same with the *os frontis*. See *ANATOMY*, n^o 11.

CORONARY VESSELS, in anatomy, certain vessels which furnish the substance of the heart with blood.

CORONARY Arteries, are two arteries springing out of

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of the aorta, before it leaves the pericardium. See ANATOMY, n° 387, b. and 386, d.

CORONARY *Vein*, a vein diffused over the exterior surface of the heart. *Ibid.* n° 386, d.

Stomachic CORONARY, a vein inserted into the trunk of the splenic vein, which, by uniting with the mesenteric, forms the vena porta. See ANATOMY, n° 387, k.

CORONARIÆ, in botany, the 10th order of plants in Linnæus's Fragments of a natural method. Under this name, instead of the more obvious one *libaceæ*, Linnæus collects a great number of genera, most of which furnish very beautiful garden-flowers, viz. albuca, cyanella, fritillaria, helonias, hyacinthus, hypoxis, lilium, melanthium, ornithogalum, scilla, tulipa, agave, aletris, aloe, anthericum, aphodelus, bromelia, burmannia, hemerocallis, polianthes, tilandisia, veratrum, yucca.

CORONELLI (Vincent), a famous geographer, born at Venice. His skill in the mathematics having brought him to the knowledge of the count d'Elstrees, his eminence employed him in making globes for Lewis XIV. With this view Coronelli spent some time at Paris; and left a great number of globes there, which are esteemed. In 1685, he was made cosmographer to the republic of Venice; and four years after, public professor of geography. He founded an academy of cosmography at Venice; and died in that city in 1718. He published above 400 geographical charts, an abridgement of cosmography, several books on geography, and other works.

CORONER, (*coronator*) an ancient officer in England, so called because he hath principally to do with pleas of the crown, or such wherein the king is more immediately concerned. And in this light, the lord chief justice of the king's bench is the principal coroner in the kingdom; and may, if he pleases, exercise the jurisdiction of a coroner in any part of the realm. But there are also particular coroners for every county of England; usually four, but sometimes six, and sometimes fewer. This officer is of equal authority with the sheriff; and was ordained, together with him, to keep the peace when the earls gave up the wardship of the county.

He is chosen by all the freeholders of the county court; and by the statute of Westminster 1. it was enacted, that none but lawful and discreet knights should be chosen; but it seems now sufficient if a man have lands enough to be made a knight, whether he be really knighted or not: for the coroner ought to have an estate sufficient to maintain the dignity of his office, and answer any fines that may be made upon him for his misbehaviour; and, if he hath not enough to answer, his fine shall be levied on the county, as a punishment for electing an insufficient officer. Now, indeed, through the culpable neglect of gentlemen of property, this office has been suffered to fall into disrepute, and get into low and indigent hands: so that although formerly no coroners would be paid for serving their country, and they were by the aforesaid statute of Westminster 1. expressly forbidden to take a reward under pain of great forfeiture to the king; yet for many years past they have only desired to be chosen for the sake of their perquisites; being allow-

ed fees for their attendance by the statute 3 Hen. VII. c. 1. which Sir Edward Coke complains of heavily, though since his time those fees have been much enlarged.

The coroner is chosen for life; but may be removed, either by being made sheriff, or chosen *verderer*, which are offices incompatible with the coroner; and by the statute 25 Geo. II. c. 29. extortion, neglect, or misbehaviour, are also made causes of removal.

The office and power of a coroner are also, like those of the sheriff, either judicial or ministerial; but principally judicial. This is in great measure ascertained by statute 4 Edw. I. *De officio coronatoris*; and consists, first, in inquiring, when any person is slain, or dies suddenly, or in prison, concerning the manner of his death. And this must be *super vium corporis*; for if the body is not found, the coroner cannot sit. He must also sit at the very place where the death happened. And his inquiry is made by a jury from four, five, or six of the neighbouring towns, over whom he is to preside. If any be found guilty by this inquest of murder, he is to commit to prison for farther trial, and is also to inquire concerning their lands, goods, and chattels, which are forfeited thereby; but whether it be murder or not, he must inquire whether any dead and has accrued to the king, or the lord of the franchise, by this death; and must certify the whole of this inquisition to the court of king's bench, or the next assizes. Another branch of his office is to inquire concerning shipwrecks; and certify whether wreck or not, and who is in possession of the goods. Concerning treasure-trove, he is also to inquire concerning the finders, and where it is, and whether any one be suspected of having found and concealed a treasure; "and that may well be perceived, (saith the old statute of Edw. I.) where one liveth riotously, haunting taverns, and hath done so of long time;" whereupon he might be attached and held to bail upon this suspicion only.

The ministerial office of the coroner is only as the sheriff's substitute. For when just exception can be taken to the sheriff, for suspicion of partiality, (as that he is interested in the suit, or of kindred to either plaintiff or defendant), the process must then be awarded to the coroner, instead of the sheriff, for execution of the king's writs.

CORONET. See CROWN.

CORONET, or *Crown*, of a *Horse*, the lowest part of the paltrim, which runs round the coffin, and is distinguished by the hair joining and covering the upper part of the hoof.

CORONILLA, *jointed podded* COLUTEA; a genus of the decandria order, belonging to the diadelphia class of plants. To this genus Linnæus also joins the *emerus*, or *Scorpion fena*; though Mr Miller makes it a distinct species. There are 11 species, all of them plants of considerable beauty, with very bright yellow flowers. All of them, however, are rather too tender for this climate, except the *emerus*. This species rises with a shrubby stem, branching numerously six or eight feet high, closely garnished with winged leaves of three pair of lobes, terminated by an odd one; and, at the sides of the branches, numerous long flower-stalks, each supporting two or three large yellow flowers.

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flowers of the papilionaceous kind, succeeded by longish pods; it is easily propagated by seeds, and likewise by layers, or cuttings. The leaves of this plant are esteemed laxative, and used as a substitute for common fena in some parts of Europe. A dye is procured by fermentation from the leaves, like that of indigo.

CORONOID, and CONDYLROID, *Proceffes*. See ANATOMY, n^o 256.

CORPORAL, an inferior officer under a serjeant, in a company of foot, who has charge over one of the divisions, places and relieves sentinels, and keeps good order in the corps de garde: he also receives the word from the inferior rounds, which passes by his corps de garde. This officer carries a fusée, and is commonly an old soldier: there are generally three corporals in each company.

CORPORAL of a *Ship of War*, an officer under the master at arms, employed to teach the officers the exercise of small arms, or of musketry; to attend at the gang-way, or entering ports, and observe that no spirituous liquors are brought into the ship, unless by express leave from the officers. He is also to extinguish the fire and candles at eight o'clock in winter, and nine in summer, when the evening gun is fired; and to walk frequently down in the lower decks in his watch, to see that there are no lights but such as are under the charge of proper centinels.

CORPORATION, a body politic or incorporate, so called, because the persons or members are joined into one body, and are qualified to take, grant, &c.

Of corporations there is a great variety subsisting, for the advancement of religion, of learning, and of commerce; in order to preserve entire and for ever those rights and immunities, which, if they were granted only to those individuals of which the body corporate is composed, would upon their death be utterly lost and extinct. To shew the advantages of these incorporations, let us consider the case of a college in either of our universities, founded *ad studendum et orandum*, for the encouragement and support of religion and learning. If this was a mere voluntary assembly, the individuals which compose it might indeed read, pray, study, and perform scholastic exercises together, so long as they could agree to do so: but they could neither frame, nor receive, any laws or rules of their conduct; none at least which would have any binding force, for want of a coercive power to create a sufficient obligation. Neither could they be capable of retaining any privileges or immunities: for, if such privileges be attacked, which of all this unconnected assembly has the right or ability to defend them? And, when they are dispersed by death or otherwise, how shall they transfer these advantages to another set of students, equally unconnected as themselves? So also, with regard to holding estates or other property, if land be granted for the purposes of religion or learning to 20 individuals not incorporated, there is no legal way of continuing the property to any other persons for the same purposes, but by endless conveyances from one to the other, as often as the hands are changed. But when they are consolidated and united into a corporation, they and their successors are then considered as one person in law: as one person, they have one will, which is col-

lected from the sense of the majority of the individuals: this one will may establish rules and orders for the regulation of the whole, which are a sort of municipal laws of this little republic; or rules and statutes may be prescribed to it at its creation, which are then in the place of natural laws: the privileges and immunities, the estates and possessions, of the corporation, when once vested in them, will be for ever vested, without any new conveyance to new successors; for all the individual members that have existed from the foundation to the present time, or that shall ever hereafter exist, are but one person in law, a person that never dies: in like manner as the river Thames is still the same river, though the parts which compose it are changing every instant.

The honour of originally inventing these political constitutions entirely belongs to the Romans. They were introduced, as Plutarch says, by Numa; who finding, upon his accession, the city torn to pieces by the two rival factions of Sabines and Romans, thought it a prudent and politic measure to subdivide these two into many smaller ones, by instituting separate societies of every manual trade and profession. They were afterwards much considered by the civil law, in which they were called *universitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together: they were adopted also by the canon law, for the maintenance of ecclesiastical discipline; and from them our spiritual corporations are derived. But our laws have considerably refined and improved upon the invention, according to the usual genius of the English nation: particularly with regard to sole corporations, consisting of one person only, of which the Roman lawyers had no notion; their maxim being, that "*tres faciunt collegium*;" though they held, that if a corporation, originally consisting of three persons, be reduced to one, "*si universitas ad unum redit*," it may still subsist as a corporation, "*et flet nomen universitatis*."

As to the several sorts of corporations, the first division of them is into *aggregate* and *sole*. Corporations AGGREGATE consist of many persons united together into one society, and are kept up by a perpetual succession of members, so as to continue for ever: of which kind are the mayor and commonalty of a city, the head and fellows of a college, the dean and chapter of a cathedral church. Corporations SOLE consist of one person only and his successors, in some particular station, who are incorporated by law, in order to give them some legal capacities and advantages, particularly that of perpetuity, which in their natural persons they could not have had. In this sense the king is a sole corporation: so is a bishop: so are some deans and prebendaries, distinct from their several chapters: and so is every parson and vicar. And the necessity, or at least use, of this institution will be very apparent, if we consider the case of a parson of a church. At the original endowment of parish-churches, the freehold of the church, the church-yard, the parsonage-house, the glebe, and the tithes of the parish, were vested in the then parson by the bounty of the donor, as a temporal recompence to him for his spiritual care of the inhabitants, and with intent that the same emoluments should ever afterwards continue as a recom-

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pence for the same care. But how was this to be effected? The freehold was vested in the parson; and, if we suppose it vested in his natural capacity, on his death it might descend to his heir, and would be liable to his debts and incumbrances: or at best the heir might be compellable, at some trouble and expence, to convey these rights to the succeeding incumbent. The law therefore has wisely ordained, that the parson, *quatenus* parson, shall never die, any more than the king; by making him and his successors a corporation. By which means all the original rights of the parsonage are preserved entire to the successor: for the present incumbent, and his predecessor who lived seven centuries ago, are in law one and the same person; and what was given to the one was given to the other also.

Another division of corporations, either sole or aggregate, is into *ecclesiastical* and *lay*. ECCLESIASTICAL corporations are where the members that compose it are entirely spiritual persons; such as bishops; certain deans and prebendaries; all archdeacons, parsons, and vicars; which are sole corporations: deans and chapters at present, and formerly prior and convent, abbot and monks, and the like, bodies aggregate. These are erected for the furtherance of religion, and perpetuating the rights of the church.—*LAY* corporations are of two sorts, *civil* and *elemosynary*. The *civil* are such as are erected for a variety of temporal purposes. The king, for instance, is made a corporation to prevent in general the possibility of an *interregnum* or vacancy of the throne, and to preserve the possessions of the crown entire; for, immediately upon the demise of one king, his successor is in full possession of the regal rights and dignity. Other lay corporations are erected for the good government of a town or particular district, as a mayor and commonalty, bailiff and burgesses, or the like: some for the advancement and regulation of manufactures and commerce; as the trading companies of London, and other towns: and some for the better carrying on of divers special purposes; as church-wardens, for conservation of the goods of the parish; the college of physicians and company of surgeons in London, for the improvement of the medical science; the royal society for the advancement of natural knowledge; and the society of antiquarians for promoting the study of antiquities. The *elemosynary* sort are such as are constituted for the perpetual distribution of the free aims, or bounty, of the founder of them to such persons as he has directed. Of this kind are all hospitals for the maintenance of the poor, sick, and impotent; and all colleges, both *in our universities* and *out of them*: which colleges are founded for two purposes; 1. For the promotion of piety and learning by proper regulations and ordinances. 2. For imparting assistance to the members of those bodies, in order to enable them to prosecute their devotion and studies with greater ease and assiduity. And all these elemosynary corporations are, strictly speaking, lay, and not ecclesiastical, even though composed of ecclesiastical persons,

and although they in some things partake of the nature, privileges, and restrictions of ecclesiastical bodies.

Having thus marshalled the several species of corporations, let us next proceed to consider, 1. How corporations in general may be created. 2. What are their powers, capacities, and incapacities. And, 3. How they may be dissolved.

1. Corporations, by the civil law, seem to have been created by the mere act, and voluntary association, of their members; provided such convention was not contrary to law, for then it was *illicitum collegium*. It does not appear that the prince's consent was necessary to be actually given to the foundation of them; but merely that the original founders of these voluntary and friendly societies (for they were little more than such) should not establish any meetings in opposition to the laws of the state.

But in England the king's consent is absolutely necessary to the erection of any corporation, either impliedly or expressly given (A). The king's implied consent is to be found in corporations which exist by force of the common law, to which our former kings are supposed to have given their concurrence; common law being nothing else but custom, arising from the universal agreement of the whole community. Of this sort are the king himself, all bishops, parsons, vicars, churchwardens, and some others; who by common law have ever been held (as far as our books can shew us) to have been corporations, *virtute officii*: and this incorporation is so inseparably annexed to their offices, that we cannot frame a complete legal idea of any of these persons, but we must also have an idea of a corporation, capable to transmit his rights to his successors, at the same time. Another method of implication, whereby the king's consent is presumed, is as to all corporations by prescription, such as the city of London, and many others, which have existed as corporations, time whereof the memory of man runneth not to the contrary; and therefore are looked upon in law to be well created. For though the members thereof can shew no legal charter of incorporation, yet in cases of such high antiquity the law presumes there once was one; and that by the variety of accidents, which a length of time may produce, the charter is lost or destroyed. The methods by which the king's consent is expressly given, are either by act of parliament or charter. By act of parliament, of which the royal assent is a necessary ingredient, corporations may undoubtedly be created: but it is observable, that most of those statutes, which are usually cited as having created corporations, do either confirm such as have been before created by the king; as in the case of the college of physicians, erected by charter to Hen. VIII. which charter was afterwards confirmed in parliament; or, they permit the king to erect a corporation *in futuro* with such and such powers; as is the case of the bank of England, and the society of the British fishery. So that the immediate creative act is usually performed by the king alone, in virtue of his royal prerogative.

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(A) Cities and towns were first erected into corporate communities on the continent, and endowed with many valuable privileges, about the 11th century, (Robert. Cha. V. i. 32.); to which the consent of the feudal sovereign was absolutely necessary, as many of his prerogatives and revenues were thereby considerably diminished.

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All the other methods therefore whereby corporations exist, by common law, by prescription, and by act of parliament, are for the most part reducible to this of the king's letters patent, or charter of incorporation. The king's creation may be performed by the words "creamus, erigimus, fundamus, incorporamus," or the like. Nay it is held, that if the king grants to a set of men to have *gildam mercatoriam*, "a mercantile meeting or assembly," this is alone sufficient to incorporate and establish them for ever.

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The king (it is said) may grant to a subject the power of erecting corporations, though the contrary was formerly held: that is, he may permit the subject to name the persons and powers of the corporation at his pleasure; but it is really the king that erects, and the subject is but the instrument: for though none but the king can make a corporation, yet *qui facit per alium, facit per se*. In this manner the chancellor of the university of Oxford has power by charter to erect corporations; and has actually often exerted it in the erection of several matriculated companies, now subsisting, of tradesmen subservient to the students.

When a corporation is erected, a name must be given to it; and by that name alone it must sue, and be sued, and do all legal acts.

II. After a corporation is so formed and named, it acquires many powers and rights, which we are next to consider. Some of these are necessarily and inseparably incident to every corporation; which incidents, as soon as a corporation is duly erected, are tacitly annexed of course. As, 1. To have perpetual succession. This is the very end of its incorporation: for there cannot be a succession for ever without an incorporation; and therefore all aggregate corporations have a power necessarily implied of electing members in the room of such as go off. 2. To sue or be sued, implead or be impleaded, grant or receive, by its corporate name, and do all other acts as natural persons may. 3. To purchase lands, and hold them, for the benefit of themselves and their successors: which two are consequential to the former. 4. To have a common seal. For a corporation, being an invisible body, cannot manifest its intentions by any personal act or oral discourse: it therefore acts and speaks only by its common seal. For, though the particular members may express their private consents to any act, by words, or signing their names, yet this does not bind the corporation; it is the fixing of the seal, and that only, which unites the several assents of the individuals, who compose the community, and makes one joint assent of the whole. 5. To make by-laws or private statutes for the better government of the corporation; which are binding upon themselves, unless contrary to the laws of the land, and then they are void. But no trading company is with us allowed to make by-laws, which may affect the king's prerogative, or the common profit of the people, under penalty of 40 l. unless they be approved by the chancellor, treasurer, and chief justices, or the judges of assize in their circuits: and, even though they be so approved, still if contrary to law they are void. These five powers are inseparably incident to every corporation, at least to every corporation *aggregate*:

for two of them, though they may be practised, yet are very unnecessary to a corporation *sole*; viz. to have a corporate seal to testify his sole assent, and to make statutes for the regulation of his own conduct.

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Corporations have a capacity to purchase lands for themselves and successors; but they are excepted out of the statute of wills; so that no devise of lands to a corporation by will is good; except for charitable uses, by statute 43 Eliz. c. 4. which exception is again greatly narrowed by the statute 9 Geo. II. c. 36. And also, by a great variety of statutes, their privilege even of purchasing from any living grantor, is much abridged; so that now a corporation, either ecclesiastical or lay, must have a licence from the king to purchase, before they can exert that capacity which is vested in them by the common law: nor is even this in all cases sufficient. These statutes are generally called the statutes of mortmain. See MORTMAIN.

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The general duties of all bodies politic, considered in their corporate capacity, may, like those of natural persons, be reduced to this single one; that of acting up to the end or design, whatever it be, for which they were created by their founder.

III. How corporations may be dissolved. Any particular member may be disfranchised, or lose his place in the corporation, by acting contrary to the laws of the society, or the laws of the land: or he may resign it by his own voluntary act. But the body politic may also itself be dissolved in several ways; which dissolution is the civil death of the corporation: and in this case their lands and tenements shall revert to the person, or his heirs, who granted them to the corporation: for the law doth annex a condition to every such grant, that if the corporation be dissolved, the grantor shall have the lands again, because the cause of the grant faileth. The grant is indeed only during the life of the corporation; which may endure for ever: but, when that life is determined by the dissolution of the body politic, the grantor takes it back by reversion, as in the case of every other grant for life. The debts of a corporation, either to or from it, are totally extinguished by its dissolution; so that the members thereof cannot recover, or be charged with them, in their natural capacities: agreeable to that maxim of the civil law, "*si quid universitati debetur, singulis non debetur; nec, quod debet universitati, singuli debent.*"

A corporation may be dissolved, 1. By act of parliament, which is boundless in its operations. 2. By the natural death of all its members, in cases of an aggregate corporation. 3. By surrender of its franchises into the hands of the king, which is a kind of suicide. 4. By forfeiture of its charter, through negligence or abuse of its franchises; in which case the law judges that the body politic has broken the condition upon which it was incorporated, and thereupon the incorporation is void. And the regular course is to bring an information in nature of a writ of *quo warranto*, to inquire by what warrant the members now exercise their corporate power, having forfeited it by such and such proceedings. The exertion of this kind of law, for the purposes of the state, in the reigns of king Charles and king James II. particularly by seizing the charter of the city of London, gave great and just of-

Corporal
Corporcular

Corradini
Corrosion

sence; and though perhaps, in strictness of law, the proceedings in most of them were sufficiently regular: but the judgment against that of London was reversed by act of parliament after the revolution; and by the same statute it is enacted, that the franchises of the city of London shall never more be forfeited for any cause whatsoever. And, because by the common law corporations were dissolved, in case the mayor or head officer was not duly elected on the day appointed in the charter or established by prescription, it is now provided, that for the future no corporation shall be dissolved upon that account; and ample directions are given for appointing a new officer, in case there be no election, or a void one, made upon the charter or prescriptive day.

CORPOREAL, those qualities which denominate a body. See **QUALITY, BODY, and INCORPOREAL**.

CORPSE, a dead body.

If any one, in taking up a dead body, steals the shroud, or other apparel, it will be felony. Stealing only the corpse itself is not felony; but it is punishable as a misdemeanor by indictment at common law.

CORPULENCY, the state of a person too much loaded with flesh or fat.—For the causes and cure of *corpulency*, (see the *Index* subjoined to) **MEDICINE**.

CORPUS, in anatomy, is applied to several parts of the animal structure; as *corpus callosum*, *corpus cavernosum*, &c. See **ANATOMY**, n° 371, o, p. and 372, c.

CORPUS, is also used in matters of learning, for several works of the same nature collected and bound together.

Gratian made a collection of the canons of the church, called *corpus canonum*. The *corpus* of the civil law is composed of the digest, code, and institutes. We have also a *corpus* of the Greek poets; and another of the Latin poets.

CORPUS CHRISII, a festival of the church of England, kept on the next Thursday after Trinity-sunday, instituted in honour of the eucharist; to which also one of the colleges in Oxford is dedicated.

CORPUSCULE, in physics, a minute particle, or physical atom, being such as a natural body is made up of. By this word is not meant the elementary particles, nor the hypothetical principles of chemists; but such particles, whether of a simple or compound nature, whose parts will not be dissolved nor dissipated by ordinary degrees of heat.

CORPUSCULAR PHILOSOPHY, that way of philosophizing which endeavours to explain things, and to account for the phenomena of nature, by the motion, figure, rest, position, &c. of the corpuscles, or the minute particles of matter.

Mr Boyle sums up the chief principles of the corpuscular hypothesis, which now flourishes under the mechanical philosophy, in these particulars:

1. They suppose that there is but one catholico or universal matter, which is an extended, impenetrable, and divisible substance, common to all bodies, and capable of all forms. 2. That this matter, in order to form the vast variety of natural bodies, must have motion in some or all its assignable parts; and that this motion was given to matter by God the Creator of all

things, and has all manner of directions and tendencies. 3. Matter must also be actually divided into parts, and each of these primitive particles, fragments, or atoms of matter, must have its proper magnitude or size, as also its peculiar figure or shape. 4. They suppose also, that these differently sized and shaped particles may have as different orders and positions, whereof great variety may arise in the composition of bodies.

CORRADINI de Sezza (Peter Marcellinus) a learned civilian and cardinal, born at Sezza, in 1658, acquired the esteem and confidence of Clement XI. and died at Rome in 1743. He was the author of a learned and curious work entitled “*Vetus Latium profanum & sacrum*,” 2 vols folio; and a history of Sezza, in 4^{to}.

CORRADO (Sebastian) an Italian grammarian of the 16th century, taught the Greek and Latin tongues at Reggio, where he formed an academy of polite literature; and at length removed to Bologna, in order to be professor of those languages. He wrote several works, the most esteemed of which are, “*Questura in qua Cicconis Vita refertur*,” an excellent performance; and, “*de Lingua Latina*.” He died in 1556.

CORRECTION, in printing, the pointing out or discovering the faults in a printed sheet, in order to be amended by the compositor before it be printed off. See **PRINTING**.

CORRECTOR, in general, denotes something that mends the faults or bad qualities of others.

CORRECTOR of the Staple, a clerk belonging to the staple, whose business is to write down and record the bargains that merchants make there.

CORRECTOR, in medicine or pharmacy, an ingredient in a composition, which guards against or abates the force of another.

CORREGGIO (Antonia da), a most extraordinary painter, named from a town in the duchy of Modena, where he was born in 1594. He was a man of such great natural talents, that nothing but the deficiencies of education prevented his being the best painter in the world. This artist is noted for borrowing nothing from the works of other men, and his novelties are clear from censure. He is said to be the first who placed figures in the air, or sky, of history-pieces; and to have excelled in the art of fore-shortening, and in “the magic of ceilings.” Correggio spent the greatest part of his life at Parma; where, notwithstanding his high reputation, he was obliged to work hard for the maintenance of a large family, and was extremely poor. He died young, in 1534, by an odd circumstance: he was to have 50 crowns for a piece of work; and receiving the sum in copper, which he had to carry 12 miles in the midst of summer, he overheated himself; and indiscreetly drinking cold water, brought on a plourisy that killed him.

CORRELATIVE, something opposed to another in a certain relation. Thus, father and son are correlatives. Light and darkness, motion and rest, are relative and opposite terms.

CORROBORANTS, or **CORROBORATIVE Medicines**. See **STRENGTHENERS**.

CORROSION, in a general sense, the action of gnawing

gnawing away, by degrees, the continuity of the parts of bodies.

CORROSION, in chemistry, an action of bodies, by means of proper menstruums, that produces new combinations, and a change of their form, without converting them to fluidity.

CORROSIVE, **SUBLIMATE MERCURY**. See **CHEMISTRY**, n° 351.

CORRUATOR MUSCLE. See **ANATOMY**, *Table of the Muscles*.

CORROSIVES, in surgery, are medicines which corrode whatever part of the body they are applied to: such are burnt alum, white precipitate of mercury, white vitriol, red precipitate of mercury, butter of antimony, lapis infernalis, &c.

CORRUPTION, the destruction, extinction, or, at least, cessation for a time, of the proper mode of existence of any natural body. See **PUTREFACTION**.

CORRUPTION of Blood, in law, one of the consequences of an attainder; and is both upwards and downwards; so that an attainted person can neither inherit lands or other hereditaments from his ancestors, nor retain those he is already in possession of, nor transmit them by descent to any heir; but the same shall escheat to the lord of the fee, subject to the king's superior right of forfeiture; and the person attainted shall also obstruct all descents to his posterity, wherever they are obliged to derive a title through him to a remoter ancestor. See **ATTAINDER**.

This is one of those notions which our laws have adopted from the feudal constitutions, at the time of the Norman conquest; as appears from its being unknown in those tenures which are indisputably Saxon, or Gavel kind; wherein, though by treason, according to the ancient Saxon laws, the land is forfeited to the king, yet no corruption of blood, no impediment of descents, ensues; and on judgment of mere felony, no escheat accrues to the lord. But, by the law of England, derived as above, a man's blood is so universally corrupted by attainder, that his sons can neither inherit to him nor to any other ancestor, at least on the part of their attainted father.

This corruption of blood cannot be absolutely removed but by authority of parliament. The king may excuse the public punishment of an offender; but cannot abolish the private right which has accrued, or may accrue, to individuals as a consequence of the criminal's attainder. He may remit a forfeiture in which the interest of the crown is alone concerned; but he cannot wipe away the corruption of blood; for therein a third person hath an interest, the lord who claims by escheat. If therefore a man hath a son, and is attainted, and afterwards pardoned by the king; this son can never inherit to his father, or father's ancestors; because his paternal blood, being once thoroughly corrupted by his father's attainder, must continue so; but if the son had been born after the pardon, he might inherit; because, by the pardon, the father is made a new man, and may convey new inheritable blood to his after-born children.

This corruption of blood, thus arising from feudal principles, but perhaps extended farther than even these principles will warrant, has been long looked upon as a peculiar hardship: because the oppressive

parts of the feudal tenures being now in general abolished, it seems unreasonable to reserve one of their most inequitable consequences, namely, that the children should not only be reduced to present poverty, (which, however severe, is sufficiently justified upon reasons of public policy), but also be laid under future difficulties of inheritance, on account of the guilt of their ancestors. And therefore in most (if not all) of the new felonies treated by Parliament since the reign of Henry VIII. it is declared that they shall not extend to any corruption of blood: and by the statute 7 Anne c. 21. (the operation of which is postponed by the statute 17 Geo. II. c. 39.) it is enacted, that, after the death of the late pretender and his sons, no attainer for treason shall extend to the disinheriting any heir, nor the prejudice of any person, other than the offender himself: which provisions have indeed carried the remedy farther than was required by the hardship above complained of; which is only the future obstruction of descents, where the pedigree happens to be deduced through the blood of an attainted ancestor.

CORSAIR, a pirate, or person who scours the sea for plunder, with an armed vessel, without commission from any prince or power. A corsair differs from a privateer, in that the latter acts under a commission, and only attacks the vessels of that state at war with the state whence he had his commission.

CORSELET, a little cuirass; or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, usually placed in the front and flanks of the battle, for the better resisting the enemy's assaults, and guarding the soldiers placed behind them.

CORSICA, an island in the Mediterranean, between 8° and 10° E. Long. and between 41° and 43° N. Lat. about 100 miles south of Genoa, and subject to that republic; though the natives for many years disputed their right. The island is now in the hands of the French.

CORSNED, or **MORSEL of EXECRATION**, a species of trial or purgation * anciently in use among us, and which probably arose from an abuse of revelation in the dark ages of superstition. It consisted of a piece of cheese or bread, about an ounce in weight, which was consecrated with a form of exorcism; desiring of the Almighty that it might cause convulsions and paleness, and find no passage, if the man was really guilty; but might turn to health and nourishment, if he was innocent; as the water of jealousy among the Jews was, by God's especial appointment, to cause the belly to swell, and the thigh to rot, if the woman was guilty of adultery. This corsned was then given to the suspected person, who at the same time also received the holy sacrament: if indeed the corsned was not, as some have suspected, the sacramental bread itself; till the subsequent invention of transubstantiation preserved it from profane uses with a more profound respect than formerly. Our historians assure us, that Godwin, earl of Kent, in the reign of king Edward the Confessor, abjuring the death of the king's brother, at last appealed to his corsned, "*per buccellum deglutendum abjuravit*," which stuck in his throat and killed him. This custom has been long since gradually abolished, though the remembrance of it still subsists in certain

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|
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Cort.
Cortex.

certain phrases of abjuration retained among the common people; as, "I will take the sacrament upon it; May this morfel be my last;" and the like.

CORT (Cornelius), one of the most celebrated engravers, and best designers Holland has produced, went to Rome in about the middle of the 16th century, and settled there. It was he who taught Auguftin Caracci to engrave.

CORTES of SPAIN, a term purely Spanish, fignifying the *courts*, i. e. the states, or assembly of the states, at Madrid.

CORTES, or CORTEZ, (Ferdinand), a Spanish general, famous for the conquest of Mexico, and other victories over the natives of South America; but infamous for the cruelties he committed upon the vanquished, without regard to rank, age, or sex. It probably was on this account he was but coolly received at his return to Europe, by his royal master Charles le Quint: it is even asserted that the emperor asked him who he was? to which Cortez replied; "I am the man who have given you more provinces than your ancestors have left you towns." Died in 1554, aged 63. See MEXICO.

CORTEX, in botany, the rind, or coarse outer BARK, of plants. The organization of the outer and inner barks, which differ principally in the fineness of their texture, is particularly explained under the article PLANTS.

Wounds of the bark, and its separations from the wood, whether naturally or artificially made, are easily cured, and made to unite again by proper care. If sections be made in the rinds of the ash and sycamore of a square figure, three sides cut, and the fourth uncut, and the whole be afterwards bound round with a pack-thread, it will all unite again, only leaving a scar in each of the three sides where it was cut. If several parts of the bark of either of these trees be cut off, and entirely separated from the tree; some shallower, leaving a part of the bark on; and others deeper, to the wood itself; these pieces being again put into their places, and bound on with pack-thread, will not indeed unite, but a fresh bark will grow in their places, and thrust them away: but if they be first carefully laid on in the exact direction in which they originally grew, and then the whole part beyond the wound on every side covered with a large plaster of diachylon, or the like, and this bound over with pack-thread to keep all firmly in their places, the pieces of bark, whether cut off shallower, or deep down to the very wood of the tree, will firmly unite themselves to the places where they originally grew. This cure will be performed in about three weeks: but the outer rind of the separated pieces will not be plump, but somewhat shivelled; the edges also will recede somewhat from their original place; so that there remains a sort of scar all round. These experiments are best made in the spring season; for, in the autumn and winter, the sap ariling but weakly, the parts that should unite wither before that is brought about. The success of these experiments has made some think that the whole branch of a tree separated and bound on again might unite with the rest. But the experiments that have been made in the most favourable manner for such a trial have all proved vain,

the branch cut off withering always in a few days, however well united, and carefully kept on.

CORTEX *Peruvianus*. See CINCHONA.

CORTEX *Winteranus*. See White CINNAMON.

CORTONA, a very ancient town of Italy, mentioned by many of the Roman historians. It was originally called *Corton*, and lay to the northward of the lake Thraflymenus. It still retains the name of Cortona. E. Long. 13. o. N. Lat. 43. 15.

CORTUSA, BEAR'S-EAR SANCLE; a genus of the monogynia order, belonging to the pentandria class of plants. There are two species, both of them very low, flowery, herbaceous perennials, crowned by umbels of monopetalous, wheel-shaped flowers, of a fine red colour. They are natives of mountainous rocky parts abroad, so must have a dry lean soil; or they may be kept in pots of dry sandy earth placed in the shade, and in summer must be duly watered; and their propagation here is by slipping the roots in October.

CORUNNA, or GROVNE, a port-town of Galicia in Spain, situated on a fine bay of the Atlantic ocean, about 32 miles north of Compostella: W. Long. 9. o. and N. Lat. 43. o.

CORUS, in Jewish antiquity. See HOMER.

CORUS, in our old writers, denotes eight bushels, or a quarter.

CORUS is also a wind, so called by the Jews, rising in the summer in the west; and is that at present called the *north-east wind*.

CORUSATION, a glittering, or gleam of light issuing from any thing. It is chiefly used for a flash of lightning darting from the clouds in time of thunder.

There is a method of producing *artificial coruscations*, or sparkling fiery meteors, which will be visible not only in the dark, but at noon-day, and that from two liquors actually cold. The method is this. Fifteen grains of solid phosphorus are to be melted in about a drachm of water; when this is cold, pour upon it about two ounces of oil of vitriol; let these be shaken together, and they will at first heat, and afterwards they will throw up fiery balls in great number, which will adhere like to many stars to the sides of the glass, and continue burning a considerable time; after this, if a small quantity of oil of turpentine is poured in, without shaking the vial, the mixture will of itself take fire, and burn very furiously. The vessel should be large, and open at the top.

Artificial coruscations may also be produced by means of oil of vitriol and iron, in the following manner. Take a glass body capable of holding three quarts; put into this three ounces of oil of vitriol, and twelve ounces of water; then warming the mixture a little, throw in, at several times, two ounces, or more, of clean iron filings: upon this an ebullition and white vapours will arise: then present a lighted candle to the mouth of the vessel, and the vapour will take fire, and afford a bright fulmination, or flash like lightning. Applying the candle in this manner several times, the effect will always be the same; and sometimes the fire will fill the whole body of the glass, and even circulate to the bottom of the liquor; at others, it will only reach a little way down its neck. The great

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great caution to be used in making this experiment is the making the vapour of a proper heat : for, if too cold, few vapours will arise ; and, if made too hot, they will arise too fast, and will only take fire in the neck of the glass, without any remarkable coruscation.

CORVORANT, formerly written CORMORANT. See PELICANUS.

CORVUS, the RAVEN or CROW kind, in ornithology, a genus of birds of the order of pica; the distinguishing characteristics of which are these : The beak is convex and cultrated : the nostrils are covered with bristly feathers ; the tongue is forked and cartilaginous ; and the feet are of the walking kind. The species are 19. The most remarkable are :

1. The corax, or raven of English authors, weighs three pounds, and is about two feet two inches in length ; the colour is black, finely glossed with a rich blue ; the belly excepted, which is of a dusky colour. They build in trees, and lay five or six eggs of a pale green colour marked with small brownish spots. They are very docile birds, and may be trained up to fowling like hawks ; to fetch and carry like spaniels ; they may be taught to speak like parrots ; and, what is most extraordinary of all, they may be taught to imitate the human voice in singing. They frequent the neighbourhood of great towns, where they are useful in devouring the carcases and filth which would otherwise prove a nuisance. In clear weather they fly in pairs to a great height, making a deep loud noise, different from the common croaking. Their scent is remarkably good ; and they are very long lived. The quills of ravens sell for 12 s. per hundred, being of great use in tuning the lower notes of an harpsichord when the wires are set at a considerable distance from the sticks.

2 The corone, or carrion-crow, in the form of its body agrees with the raven ; also in its food, which is carrion and other filth. It will also eat grain and insects ; and like the raven will pick out the eyes : for which reason it was formerly distinguished from the rook, which feeds entirely on grain and insects, by the name of the *gor*, or *gor-crow*. Virgil says that its croaking foreboded rain :

Tum cornix plena pluvium vocat improba voce.

It was also thought a bird of bad omen, especially if it happened to be seen on the left hand :

Sæpe sinistra cava prædixit ab illic cornix.

England breeds more of this kind of birds than any other country in Europe. In the 24th of Henry VIII. they were grown so numerous, and thought to be so prejudicial to the farmer, that they were considered as an evil worthy of parliamentary redress ; an act was passed for their destruction, in which rooks and choughs were included. Every hamlet was to provide crow-nets for ten years ; and all the inhabitants were obliged at certain times to assemble, during that space to consult of the proper means for extirpating them. But though the crow abounds thus in Britain, it is so rare in Sweden, that Linnaeus speaks of it only as a bird that he once knew killed there. It lays the same number of eggs as the raven, and of the same colour : immediately after deserting their young they go in

pairs. Both these birds are often found white or pied : Corvus. an accident that befalls black birds more frequently than any others. Mr Pennant says, he has observed one entirely of a pale brown colour, not only in its plumage, but even in its bill and feet. The crow weighs about 20 ounces. Its length is 18 inches ; its breadth two feet two inches.

Concerning these birds, we have the following curious anecdote in Mr Edward's natural history *. * Vol. V. Pref. xxv. " The reverend Mr Robinson rector of Ousby in Westmoreland and Cumberland, says, ' that birds are natural planters of all sorts of wood and trees. They disseminate the kernels upon the earth, which like nurseries brings them forth till they grow up to their natural strength and perfection.' He says, ' About 25 years ago, coming from Rosecastle early in the morning, I observed a great number of crows very busily at their work upon a declining ground of a mossy surface : I went out of my way on purpose to view their labour, and I found they were planting a grove of oaks. The manner of their planting was thus : they first made little holes in the earth with their bills, going about and about till the hole was deep enough ; and then they dropped in the acorn, and covered it with earth and moss. The season was at the latter end of autumn when all seeds are full ripe.'

" Mr Robinson seems to think that Providence had given the crows this instinct solely for the propagation of trees ; but I imagine it was given them principally for their own preservation, by hiding provision in time of plenty, in order to supply them in a time of scarcity : for it is observed in tame pies and daws kept about houses, that they will hide their meat when they have plenty of it, and fetch it from their hiding-places when they want it. So that such an instinct in these birds may answer a double purpose ; both their own support in times of need, and the propagation of the trees they plant : for wherever they hide a great number of nuts or grain in the earth, we cannot suppose they find them all again ; but that as many will remain in the plot of ground they make use of, as can well grow by one another."

3. The frugilegus, or rook, is the *corvus* of Virgil ; no other species of this kind being gregarious.

E passu decedens agmine magno

Corporum increpuit densæ exercitus alas.

A very natural description of the evening return of these birds to their nests.

The rook differs not greatly in its form from the carrion crow : the most remarkable difference is in the bill ; the nostrils, chin, and sides of that and the mouth being in old birds quite white and bared of feathers by often thrusting the bill into the ground in search of the erucæ of the dor-beetle †. The rook then, instead of † The *Scorabæus Melanobanus* being proscribed, should be treated as the farmer's friend ; as it clears his ground from caterpillars, which do incredible damage by eating the roots of the corn. Rooks are social birds, living in vast flocks : but crows go only in pairs. They begin to build their nests in March ; one bringing materials, while the other watches the nest, lest it should be plundered by its brethren : they lay the same number of eggs as the crow, and of the same colour, but less. After the breeding season, the rooks forsake their nest-trees, and for

some time go and rook elsewhere, but return to them in August: in October they repair their nests.

4. The cornix, or roylton crow, pretty much resembles the rook, feeding on insects, and flying together in great flocks. In England it is a bird of pasture, visiting that kingdom in the beginning of winter, and leaving it with the woodcocks. In the maritime parts they feed on crabs and shell-fish. They are very common in Scotland: in many parts of the Highlands, and in all the Hebrides, Orkneys, and Shetland, it is the only species of genuine crow; the carrion, and rook, being unknown there. It breeds and continues in those parts the whole year round. In the Highlands, they breed indifferently in all kinds of trees: lay six eggs: have a shriller note than the common crows; are much more mischievous; pick out the eyes of lambs, and even of horses when engaged in bogs. They are, therefore, in many places proscribed, and rewards given for killing them. For want of other food these birds will eat cran-berries, or other mountain berries.

5. The monedula, or jack-daw, weighs nine ounces; the length thirteen inches, the breadth twenty-eight. The head is large in proportion to its body; which, Mr Willughby says, argues him to be ingenious and crafty. The irides are white: the breast and belly are of a dusky hue inclining to ash-colour: the rest of the plumage is black, slightly glossed with blue: the claws very strong and hooked. It is a docile and loquacious bird. Jack-daws breed in steeples, old castles, and in high rocks, laying five or six eggs. Sometimes they have been known to breed in hollow-trees near a rookery, and join those birds in their foraging parties. In some parts of Hampshire, they make their nests in rabbit holes: they also build in the interstices between the upright and transum stones of *Stonhenge*; a proof of the prodigious height of that stupendous antiquity, for their nests are placed beyond the reach of the shepherd boys, who are always idling about this spot. They are gregarious birds; and feed on insects, grain, and feeds.

6. The glandularius, or jay, is one of the most beautiful British birds. The weight is between six and seven ounces: the length 13 inches, the breadth 20½. The forehead is white streaked with black: the head is covered with very long feathers, which it can erect at pleasure into the form of a crest: the whole neck, back, breast, and belly, are of a faint purple dathed with grey: the covert-feathers of the wings are of the same colour. The first quill-feather is black; the exterior webs of the nine next are ash-coloured; the interior webs dusky; the six next are black, but the lower sides of their exterior webs are white tinged with blue; the two next wholly black; the last of a fine bay colour tipped with black. The lesser coverts are of a light bay: the greater covert feathers most beautifully barred with a lively blue, black, and white: the rest are black: the rump is white. The tail consists of twelve black feathers. The feet are of a pale brown; the claws large and hooked. It lays five or six eggs of a dull whitish olive, mottled very obscurely with pale brown. The nest is made entirely of the fine fibres of roots of trees; but has for the foundation a few coarse sticks. It is generally placed on the top

of the underwood, such as hazels, thorns, or low birch. The young follow their parents till the spring: in the summer they are very injurious to gardens, being great devourers of pease and cherries. In the autumn and winter they feed on acorns, from whence the Latin name. Dr Kramer observes, that they will kill small birds. Jays are very docile, and may be taught to imitate the human voice: their native note is very loud and disagreeable. When they are enticing their fledged young to follow them, they emit a noise like the mewling of a cat.

7. The caryocatactes, or nutcracker, is by far the most beautiful of the European birds. It is very common in Germany, Denmark, &c. and feeds on nuts. It is somewhat less than the jack-daw: the bill is strong, straight, and black: the colour of the whole head and neck, breast and body, of a rusty brown: the crown of the head and rump are plain: the other parts marked with triangular white spots: the wings black: the coverts spotted in the same manner as the body: the tail rounded at the end, black tipped with white: the vent-feathers white: the legs dusky.

8. The pica, or magpie, is so well known that it would be superfluous to describe it minutely. It bears a great resemblance to the butcher-bird in its bill, which has a sharp process near the end of the upper mandible. It resembles the same also in the shortness of its wings, and the form of its tail; each feather shortening from the two middlemost. It agrees also in its food, which consists of worms, insects, and small birds. It will destroy young chickens; and is a crafty, restless, and noisy bird. It is easily tamed; and may be taught to imitate the human voice. It builds its nest with great art, covering it entirely with thorns, except one small hole for admittance. It lays six or seven eggs of a pale green colour spotted with green. It weighs near nine ounces: the length is 18 inches; the breadth 24.

9. The graculus, or red-legged crow, is but thinly scattered over the northern world: no mention is made of it by any of the Faunists; nor do we find it in other parts of Europe, except England and the Alps. It is produced in the island of Candia in Asia; and it visits Egypt towards the end of the inundations of the Nile. Except in Egypt, it affects mountainous and rocky places; builds its nest in high cliffs, or ruined towers; and lays four or five eggs, white, spotted with a dirty yellow. It feeds on insects, and also on new-fown corn. They commonly fly high, make a shriller noise than the jack-daw, and may be taught to speak. It is a very tender bird, and unable to bear very severe weather: is of an elegant, slender-make; active, restless and thieving; much taken with glitter, and so meddling as not to be trusted where things of consequence lie. It is very apt to catch up bits of lighted sticks; so that there are instances of houses being set on fire by its means; on which account Camden calls it *incendiaria avis*. It is found in Cornwall, Flintshire, Caernarvonshire and Anglesea, in the rocky cliffs along the shores. It is also found in Scotland as far as Strathnavern; and in some of the Hebrides. Its colour is wholly black, beautifully glossed over with blue, and purple: the legs and bill are of a bright orange colour inclining to red: the tongue is almost as long as the bill, and

Corvus and a little cloven: the claws large, hooked and black.

CORVUS, the *Raven*, in astronomy. See ASTRONOMY, n^o 266.

CORVUS, in Roman antiquity, a military engine, or rather gallery, moveable at pleasure by means of pulleys; chiefly used in boarding the enemy's ships to cover the men. The construction of the corvus was as follows. They erected on the prow of their vessels a round piece of timber of about a foot and an half diameter, and about 12 feet long; on the top of which they had a block or pulley. Round this piece of timber they laid a stage or platform of boards, four feet broad, and about 18 feet long, which was well framed, and fastened with iron. The entrance was long-ways, and it moved about on the above-mentioned upright piece of timber as on a spindle, and could be hoisted up within six feet of the top: about this was a sort of parapet knee-high, which was defended with upright bars of iron sharpened at the end, and towards the top there was a ring, by the help of which and a pulley or tackle, they raised or lowered the engine at pleasure. With this moveable gallery they boarded the enemy's vessels, (when they did not oppose side to side), sometimes on their bow, and sometimes on their stern, as occasion best served. When they had grappled the enemy with these iron spikes, if they happened to swing broadside to broadside, then they entered from all parts; but in case they attacked them on the bow, they entered two and two by the help of this machine, the foremost defending the foreparts, and those that followed the flanks, keeping the bows of their bucklers level with the top of the parapet.

CORYATE (Thomas), a very extraordinary personage, who seems to have made himself famous by his whimsical extravagancies, was the son of a clergyman, and born at Oldcombe in Somersetshire in 1577. He acquired Greek and Latin at Oxford; and coming to London, was received into the household of Henry prince of Wales. If Coryate was not over witty himself, he got acquainted with the wits of that time, and served to exercise their abilities, having more learning than judgment. He was a great peripatetic: for, in 1608, he took a long journey on foot; and after he returned, published his travels under the following strange title, *Crudities hastily gobbled up in five months Travels in France, Savoy, Italy, Rhetia, Helvetia, some parts of High Germany, and the Netherlands*, Lond 1611, 4^{to}. In 1612 he set out again, with a resolution to spend ten years in travelling: he went first to Constantinople; and after travelling over a great part of the East, died of a flux at Surat in the East-Indies. Some of the accounts of his peregrinations are to be found in the accounts of Purchas's Pilgrimages.

CORYBANTES, in antiquity, priests of the goddess Cybele, who, inspired with a sacred fury, danced up and down, tossing their heads, and beating on cymbals or brazen drums. They inhabited mount Ida, in the island of Crete, where they nourished the infant Jupiter, keeping a continual rattling with their cymbals, that his father Saturn, who had resolved to devour all his male offspring, might not hear the child's cries.

CORYBANTICA, in Grecian antiquity, a festival kept in honour of the Corybantes.

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CORYCOMACHIA, among the ancients, was a sort of exercise in which they pushed forwards a ball, suspended from the ceiling, and at its return either caught it with their hands, or suffered it to meet their body. Oribasius informs us it was recommended for extenuating too gross bodies.

CORYDALES, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnæus, containing the following genera, viz. epimedium, hiepecum, leontice, melianthus, pinguicula, and utricularia.

CORYDALIS, in botany. See FUMARIA.

CORYLUS, the HAZLE; a genus of the polyandria order, belonging to the monœcia class of plants. Mr Miller reckons three species, though other botanists make only two. They are all of the large shrub kind, hardy and deciduous; and have several varieties, valuable for their nuts, as also for their variety in large wildernesses and shrubbery works. They will prosper in almost any soil or situation, and turn out to good account when growing in coppices to cut as underwood, and as poles for various uses, as hoops, spars, hurdles, handles to husbandry implements, walking-sticks, fishing-rods, &c. for which purposes they may be cut every 5th, 7th, or 8th year, according to the purposes for which they are designed. The best method of propagating them is by layers, though they may also be raised from the nuts.

CORYMBIFERÆ, in botany, the name of an order or division of the compound flowers adopted by Linnæus after Ray and Vaillant, in the former editions of his *Fragments of a Natural Method*. This title in the latter editions is changed for *Discoideæ*, another name borrowed from Ray's Method, but used in a somewhat different sense.

CORYMBUS, properly signifies a cluster of ivy berries. Among botanists, it is a mode of flowering in which the lesser or partial flower-stalks are produced along the common stalk on both sides; and, though of unequal lengths, rise to the same height, so as to form a flat and even surface at the top. See BOTANY, p. 1294. n^o 32.

CORYPHÆNA, in ichthyology, a genus belonging to the order of thoracici. The head is declined and truncated; the branchiostegæ membrane has six rays; and the back-fin runs the whole length of the back. There are twelve species, most of them natives of foreign seas. The most remarkable are the blue and parrot fishes, described by Mr Catfish. The head of the first is of an odd structure, resembling that of the spermæci whale: the mouth is small, each mandible armed with a single row of even teeth, so closely joined that they seem entire bones; the iris of the eye is red. On the back is a long piliant fin, somewhat indented on the edge; behind the gills are two fins, one under the abdomen, and another behind the anus. The tail is forked; and the whole fish entirely blue. They are taken on the coasts of the Bahama Islands, and in most of the seas between the tropics.

The parrot-fish hath a large mouth, paved as it were with blunt teeth, closely connected, after the manner of the *lupus marinus*. The body is covered with large green scales; the eyes are red and yellow; the upper part of the head brown, the lower part and the

Coryphæus gills blue, bordered with a dusky red : a streak of red extends from the throat behind the gills, at the upper end of which is a bright yellow spot. The fins are five in number, one extending almost the length of the back, of a bay or cinnamon colour ; there are two behind the gills, blended with black, green, and purplish colours, with the upper edge verged with blue : under the abdomen is another red fin verged with blue : under the anus extends another long narrow green fin, with a list of red through the middle of it : at the basis of the tail on each side is a large yellow spot. The tail is large, forked, and green, with a curved red line running through the middle parallel to the curve, and ending in two points. This fish is more esteemed for beauty than the delicacy of its taste. They are taken on the coasts of Hispaniola, Cuba, and the Bahama Islands.

CORYPHÆUS, in the ancient tragedy, was the chief or leader of the company that composed the chorus. See **CHORUS**. The word is formed from the Greek *κορυφή*, "tip of the head." The coryphæus spoke for all the rest, whenever the chorus took part in the action, in quality of a person of the drama, during the course of the acts. Hence coryphæus had passed into a general name for the chief or principal of any company, corporation, sect, opinion, &c. Thus, Eustacius of Antioch is called the *coryphæus* of the council of Nice ; and Cicero calls Zeno the *coryphæus* of the stoics.

CORYZA, in medicine, a catarrh of the nose. See (the *Index* subjoined to) **MEDICINE**.

CORZOLA, or **CURSCOLA**, an island in the gulf of Venice, divided from Ragusa in Dalmatia by a narrow strait. E. Long. 18. o. N. Lat. 42. 35.

COS, the **WHESTONE**, in natural history, a genus of vitrescent stones, consisting of fragments of an indeterminate figure, sub-opaque, and granulated.

Of this genus there are several species, some consisting of rougher, and others of smoother, or even of altogether impalpable particles ; and used not only for whet-stones, but also for mill-stones, and other the like purposes.

CO-SECANT, in geometry, the secant of an arch which is the complement of another to 90°. See **GEOMETRY**.

COSENING. See **COZENING**.

COSENZA, the capital of the Hither Calabria, in the kingdom of Naples. E. Long. 16. 35. N. Lat. 39. 15. It is an archbishop's see.

COSHERING, in the feudal customs, a kind of right of the lords to lie and feast themselves and their followers at their tenants houses. The word *coshering* may perhaps be derived from the old English word *coþbe*, a cot or cottage.

CO-SINE, in trigonometry, the sine of an arch which is the complement of another to 90°. See **GEOMETRY**.

COSMETIC, in physic, any medicine or preparation which renders the skin soft and white, or helps to beautify and improve the complexion ; as lip-salves, cold creams, cerufs, &c.

COSMICAL, a term in astronomy, expressing one of the poetical risings of a star : thus a star is said to rise cosmically when it rises with the sun, or with that

point of the ecliptic in which the sun is at that time : **Cosmic** and the cosmical setting is when a star sets in the west at the same time that the sun rises in the east.

COSMOGONY, or **COSMOLOGY**, a knowledge of the original formation of the different parts of this visible system. See **EARTH**, and **CREATION**.

COSMOGRAPHY, a description of the several parts of the visible world. It is divided into two parts, **ASTRONOMY** and **GEOGRAPHY**. See these two articles.

COSMOPOLITE, or **COSMOPOLITAN**, a term sometimes used to signify a person who has no fixed living or place of abode, or a man who is a stranger nowhere. The word comes from the Greek *κοσμος*, "world," and *πολις*, "city." One of the ancient philosophers being interrogated what countryman he was ? answered, he was a *cosmopolite*, i. e. an inhabitant or citizen of the world.

COSSACKS, a name given to the people inhabiting the banks of the rivers Nieper and Don, near the Black Sea and borders of Turkey. There are several kinds of Cossacks : the most known are those of the Don, the Zaporavian, and the Ukraine Cossacks. They inhabit the Ukraine, which is also called *Mala Russia*, or Little Russia, and is unquestionably one of the finest countries in Europe. They were once a free people, and of the same descent with the Poles. When united, they could bring an army of 150,000 men into the field. They were long under the protection of the republic of Poland, and were of great service in the wars against the Turks. At last, however, the Poles attempted to treat them like slaves ; upon which they revolted, and chose for their leader one *Hettman Chelminski*, who put himself under the protection of the Turks. Some years after the death of Chelminski, his successor Doroschonko submitted himself and his country to the Russians. This brought on a war which terminated in the destruction of the town of Czigrin, at that time the capital of the Ukraine. This happened in 1674. For some years after this they preserved all their privileges, and were governed by a prince of their own choosing. But having taken part with Charles XII. of Sweden against the Russians, they were reduced by Peter the Great, so as to be incapable of ever shaking off the yoke. They were, however, restored to their former state by the empress Elizabeth, in which they still continue.

The customs of this people are singular : no Zaporavian Cossack is allowed to marry within the precincts of their territory. If he is married, his wife must live in some neighbouring country, where he resorts to her from time to time ; and even this intercourse must be without the knowledge of the elders. They do not even suffer women to remain at the house of any stranger that happens to come among them. They are great thieves and robbers ; but, if any one should steal from his neighbour, he is tied to a post in some public place : A bottle of brandy, a loaf of bread, and a number of strong sticks, are set by his side ; when every one that passes has a right to give him as many blows as he pleases ; after which he may refresh the sufferer with a little brandy and a morsel of bread. The criminal remains thus tied for twenty-four hours together, and often five times as long :

long; after which, if he has the good luck to survive the blows, he is again received into the society. The whole republic is made up entirely of thieves and vagabonds, who subsist on nothing but rapine and plunder both in peace and war. The court of Russia cannot hinder their continual excursions; nay, is even obliged to keep measures with them, for fear of their changing sides.

The Don Cossacks were originally Russian peasants, to whom the yoke of their masters having proved intolerable, they by degrees took refuge in this country, where they established themselves into a commonwealth. In process of time they voluntarily put themselves under the protection of the Russian empire, by which they are very mildly treated. They are excellent soldiers, and can bring 15,000 men into the field. Their general, or chief of their republic, is styled *voiskovoy attaman*: he is chosen by themselves from among the principal officers of the nation; but he must be confirmed by the court.

COSSET, among farmers, a colt, calf, or lamb, brought up by hand without the dam.

COSTA (Christopher a), a celebrated botanist of the 16th century, was born in Africa, of a Portuguese father, and went into Asia to perfect himself in the knowledge of simples, where he was taken prisoner, but found means to make his escape, and after several voyages practised physic at Bourges. He wrote, 1. A treatise on Indian drugs and medicines. 2. His voyages to the Indies. 3. A book in praise of women; and other works.

COSTAL, an appellation given by anatomists to several parts belonging to the sides: thus we meet with costal muscles, vertebrae, &c.

COSTANZO (Angelo di), an Italian historian and poet, lord of Catalupo, was born in 1507, of a noble and ancient family of Naples, and died about 1591. He wrote, 1. A history of Naples, from 1250 to 1489, the best edition of which is that of Aquila, in 1582, in folio, very scarce. 2. Italian poems, which are esteemed, and have had several editions.

COSTA-RICCA, a province of North America in New Spain, and in the audience of Guatimala, bounded on the north-east by the northern ocean, on the south-west by the south sea, on the north-west by Nicaragua, and on the south-east by Veragua. The soil is not very fertile, though there is plenty of cattle. Carthage is the capital town.

COSTIVENESS, a preternatural detention of the feces, with an unusual dryness and hardness thereof, and thence a suppression of their evacuation. See (the *Index* subjoined to) MEDICINE.

COSTMARY, the English name of a species of tansy. See TANACETUM.

COSTS, in law, imply the expenses of a suit recovered by the plaintiff, together with damages. Costs were not allowed by the common law, the amercement of the vanquished party being his only punishment; but they are given by statute*. Costs are allowed in chancery for failing to make answer to a bill exhibited; or making an insufficient answer: and if a first answer be certified by a master to be insufficient, the defendant is to pay 40 s.; 3 l. for a second insufficient answer; 4 l. for a third, &c. But if the

answer be reported good, the plaintiff shall pay the defendant 40 s. costs.

COSTUME, a rule or precept in painting, by which the artist is enjoined to make every person and thing sustain its proper character, and not only observe the story, but the circumstances, the scene of action, the country or place, and take care that the habits, arms, manners, proportions, and the like, exactly correspond.

COSTUS, a genus of the monogynia order, belonging to the monandria class of plants. There is but one species, viz. the arabicus, a native of the Indies. The root was formerly in some esteem as an attenuant, and serviceable in venereal complaints; but is now rarely prescribed or met with in the shops.

COTA (Rodriguez), a Spanish poet in the 16th century, was the author of the *Tragi-comedia de Calisto y Melibea*, which has been translated into Latin by Gaspar Barthius, and into French by James de Lavaradin. The Spaniards set a great value on this performance.

CO-TANGENT, the tangent of an arch which is the complement of another to 90°. See GEOMETRY.

COTBUS, a town of Germany in Lower Lusatia: it is a strong important place, and has been subject to the king of Prussia ever since the year 1645. It is seated on the river Spree, 60 miles south by east of Berlin, and 55 south-east of Wirtemberg. Here are a great number of French Protestants, who have introduced manufactures; and this place is noted for excellent beer, pitch, and the cultivation of flax. E. Long. 15. 29. N. Lat. 51. 40.

COTELERIUS (John-Baptist), fellow of the Sorbonne, and king's Greek professor, was born at Nismes in Languedoc in 1627. He made a collection of the fathers who lived in the apostolic age, which he published at Paris in two volumes folio in 1672; all reviewed and corrected from several MSS. with a Latin translation and notes. He also published *Monumenta Ecclesie Græcæ*, in 3 vols. being a collection of Greek tracts out of the king's and M. Colbert's libraries, and which had never been published before: to these he added a Latin translation and notes. He intended a farther prosecution of this work; but his intense studies broke his constitution, and deprived him of life in 1686. Besides his great skill in languages and ecclesiastical antiquities, Cotelierus was remarkable for his probity and candour.

COTES (Roger), an excellent mathematician of the 18th century. He early discovered an inclination to the mathematics; and, at 17 years of age, was admitted a pensioner of Trinity College, Cambridge. In 1706 he was appointed professor of astronomy in the professorship founded by Dr Plume archdeacon of Rochester, being chosen the first in that chair for his great merit and learning. In the year 1713, at the request of Dr Richard Bentley, he published at Cambridge, in quarto, a second edition of Sir Isaac Newton's "Principia," with all the improvements which the author had annexed thereto; to which he prefixed an excellent *Preface*. He prepared several useful books for the public; and wrote *A Description of the great Meteor* which appeared on the 6th of March 1716, published in the Philosophical Transactions. He

Cote-fowl lived but a little while to carry on the discourses for which he was eminently qualified; dying in the prime of his age in 1716, to the great regret of all the lovers of the sciences.

Cotton.

COTESWOLD, several sheep-cotes, and sheep feeding on hills. It comes from the Saxon *cote*, i. e. *cass*, "a cottage," and *wold*, "a place where there is no wood."

COTHURNIX, in ornithology, a species of *TERTRAO*.

COTHURNUS, **BUSKIN**, a very high shoe, or patten raised on soles of cork, wore by the ancient actors in tragedy to make them appear taller and more like the heroes they represented; most of whom were supposed to be giants. It covered the greatest part of the leg, and was tied beneath the knee. *Aeschylus* is said to have invented the cothurnus. See **BUSKIN**.

COTT, a particular sort of bed-frame, suspended from the beams of a ship, for the officers to sleep in between the decks. This contrivance is much more convenient at sea than either the hammocks or fixed cabins; being a large piece of canvas sewed into the form of a chest, about six feet long, one foot deep, and from two to three feet wide: it is extended by a square wooden frame with a canvas bottom, equal to its length and breadth, to retain it in an horizontal position.

COTTON, in commerce, a soft downy substance found on the gossypium, or cotton-tree. See **GOSSEPIUM**.

Cotton is separated from the seeds of the plant by a mill, and then spun and prepared for all sorts of fine works, as stockings, waistcoats, quilts, tapestry, curtains, &c. With it they likewise make muslin; and sometimes it is mixed with wool, sometimes with silk, and even with gold itself.

The finest sort comes from Bengal and the coast of Coromandel.

Cotton makes a very considerable article in commerce, and is distinguished into cotton-wool and cotton-thread. The first is brought mostly from Cyprus, St John d'Acre, and Smyrna: the most esteemed is white, long, and soft. Those who buy it in bales should see that it has not been wet, moisture being very prejudicial to it. The price of the finest is usually from six to seven pence the quintal of 44 coss.

Of cotton-thread, that of Damas, called *cotton d'ounce*, and that of Jerusalem, called *bazar*, are the most esteemed; as also that of the Antilles islands: It is to be chosen white, fine, very dry, and evenly spun. The other cotton-threads are the half bazas; the rames, the beledin, and gondezel; the payas and montafiri, the genequins, the baquins, the jossellafars, of which there are two sorts. Those of India, known by the name of Tutucorin, Java, Bengal, and Surat, are of four or five sorts, distinguished by the letters A, B, C, &c. They are sold in bags, with a deduction of one pound and a half on each of those of Tutucorin, which are the dearest, and two pounds on each bag of the other sorts. For those of Fielesbas, Smyrna, Aleppo, and Jerusalem, the deduction at Amsterdam is eight in the hundred for the tare, and two

in the hundred for weight, and on the value one per cent. for prompt payment.

Cotton of Siam, is a kind of silky cotton in the Antilles, so called because the grain was brought from Siam. It is of an extraordinary fineness, even surpassing silk in softness. They make hosiery of it there preferable to silk ones, for their lustre and beauty. They sell from 10 to 12 and 15 crowns a pair, but there are very few made unless for curiosity.

The manner of Packing COTTON as practised in the Antilles. The bags are made of coarse cloth, of which they take three ells and a half each; the breadth is one ell three inches. When the bag has been well soaked in water, they hang it up, extending the mouth of it to cross pieces of timber nailed to posts fixed in the ground seven or eight feet high. He who packs it goes into the bag, which is six feet nine inches deep, or thereabouts, and presses down the cotton, which another hands him, with hands and feet; observing to tread it equally every where, and putting in but little at a time. The best time of packing is in rainy moist weather, provided the cotton be under cover. The bag should contain from 300 to 320 pounds. The tare abated in the Antilles is three in the hundred. Cotton being a production applicable to a great variety of manufactures, it cannot be too much cultivated in our own plantations that will admit of it.

Cotton-wool, not of the British plantations, pays, on importation, $7\frac{1}{2}$ d. the pound, and draws back on exportation $57\frac{1}{2}$ d. Cotton-yarn the pound, not of the

East Indies, pays $2\frac{87}{100}$ d. and draws back $2\frac{58}{100}$ d.

Cotton-yarn the pound of the East Indies pays $4\frac{7}{100}$ d. and draws back $4\frac{3}{100}$ d.

Lowender COTTON. See **SANTOLINA**.

Philosophic COTTON, a name given to the flowers of zinc, on account of their white colour, and resemblance to cotton.

Flax made to resemble COTTON. See **FLAX**.

Silk COTTON. See **BOMBAX**.

COTTON-Wood. See **GNAPHALUM**.

COTTON (Sir Robert), a most eminent English antiquarian, descended from an ancient family, was born in 1570. In his 18th year he began to collect ancient records, charters, and other MSS. Camden, Selden, and Speed, acknowledged their obligations to him in their respective works. He was highly distinguished by queen Elizabeth, and by James I. who created him a baronet. He wrote many things himself; but our principal obligations to him are for his valuable library of MSS. which was secured to the public by two acts of parliament, and now makes part of the British museum.

COTTON (Charles), a burlesque poet, was descended of a good family, and lived in the reigns of Charles II. and James II. His most celebrated piece is *Scarronides*, or *Travels* of the first and fourth books of the *Æneid*. But though, from the title, one would be apt to imagine it an imitation of Scarron's famous *Travels* of the same author, yet, upon examination, it would be found greatly to excel not only that, but every other attempt of the same kind that hath been

hitherto

hitherto made in any language. He has also translated several of Lucian's dialogues, in the same manner, under the title of the *Scoffler Scoff'd*;—and written another poem of a more serious kind, entitled the *Wonders of the Peak*. The exact period of either Mr Cotton's birth or his death, is no-where recorded; but it is probable the latter happened about the time of the revolution. Neither is it better known what his circumstances were with respect to fortune; they appear, however, to have been easy, if one may judge from the turn of his writings, which is such as seems scarcely possible for any one to indulge whose mind was not perfectly at ease. Yet there is one anecdote told of him, which seems to shew that his vein of humour could not restrain itself on any consideration, viz. that in consequence of a single couplet in his *Virgil Travels*, wherein he has made mention of a peculiar kind of ruff worn by a grandmother of his who lived in the Peak, he lost an estate of L. 400 *per annum*; the old lady, whose humour and petty disposition he could by no means have been a stranger to, being never able to forgive the liberty he had taken with her; and having her fortune wholly at her disposal, although she had before made him her sole heir, altered her will, and gave it away to an absolute stranger.

COTTUS, or BULL-HEAD, in ichthyology, a genus belonging to the order of thoracici. The head is broader than the body, and the gill-membrane has six rays. There are six species; the most remarkable are,

1. The gobio, or river bull-head, is very common in all our clear brooks; it lies almost always at the bottom, either on the gravel, or under a stone: it deposits its spawn in a hole, which it forms among the gravel, and quits it with great reluctance. It feeds on water insects. This fish seldom exceeds the length of three inches and an half: the head is large, broad, flat, and thin at its circumference, being well adapted for insinuating itself under stones: on the middle part of the covers of the gills is a small crooked spine turning inwards. The eyes are very small: the irides yellow: the body grows slender towards the tail, and is very smooth. The colour of this fish is as disagreeable as its form, being dusky, mixed with a dirty yellow; the belly is whitish. The taste, however, is excellent.

2. The cataphractus, armed bull-head, or *pogge*, is very common on most of the British coasts. It seldom exceeds five inches and an half in length; and even seldom arrives at that size. The head is large, bony, and very rugged: the end of the nose is armed with four short upright spines: on the throat are a number of short white beards: the body is octagonal, and covered with a number of strong bony crusts, divided into several compartments, the ends of which project into a sharp point, and form several echinated lines along the back and sides from the head to the tail.

3. The scorpius, or father-lather, is not uncommon on the rocky coasts of this island; it lurks under stones, and will take a bait. It seldom exceeds 8 or 9 inches in length. The head is large, and has a most formidable appearance, being armed with vast spines, which it can oppose to any enemy that attacks it, by swelling

out its cheeks and gill-covers to a large size. The nose and space contiguous to the eyes are furnished with short sharp spines: the covers of the gills are terminated by exceeding long ones, which are both strong and very sharp pointed. The mouth is large; the jaws covered with very small teeth: the roof of the mouth is furnished with a triangular spot of very minute teeth. The back is more elevated than that of the others of this genus: the belly is prominent: the side line rough, the rest of the body very smooth, and grows slender towards the tail. The colour of the body is brown, or dusky and white marbled, and sometimes is found also stained with red: the fins and tail are transparent, sometimes clouded, but the rays barred regularly with brown: the belly is of a silvery white. This species is very frequent in the Newfoundland seas, where it is called *scoping*: it is also as common on the coast of Greenland, in deep water near the shore. It is a principal food of the natives, and the soup made of it is said to be agreeable as well as wholesome.

COTULA, MAY-WEED; a genus of the polygamia superflua order, belonging to the syngenesia class of plants. There are six species, all of them herbaceous annuals, rising 6 or 8 inches high, and adorned with yellow flowers. There are none of them natives of this country, and most of them require artificial heat.

COTULA, or *Cotyla*, in antiquity, a liquid measure among the Greeks, equal to the hemina of the Romans, containing half a sextary, or four acetabula: hence it appears that it contained 10 ounces of wine, and 9 of oil.

COTURNIX, in ornithology. See TETRAO.

COTYLEDON, NAVEL-WORT; a genus of the pentagynia order, belonging to the decandria class of plants. There are eight species, most of them hardy succulent perennials; though some require to be kept in a stove, as being natives of warm climates. They rise from half a foot to a yard and an half high, and are adorned with yellow flowers growing in umbels. They are easily propagated either by seed or cuttings of their branches.

COTYLEDONES, in anatomy, are certain glandular bodies, adhering to the chorion of some animals. *Milne's Bot. Diff.*

COTYLEDONES, in botany, the perishable, porous side-lobes of the seed, which involve, and for some time furnish nourishment to, the embryo plant. The lobes in question, which are generally two in number, are very conspicuous in the bean and most of the leguminous tribe, on stripping off the hulk or outer cover of the seed; particularly if they have previously been laid in earth or water. Their substance is mealy, mucilaginous, and easily ferments. They result from the expansion of an infinite number of branching vessels. The lobes are externally convex, internally flat, unless where they are united and infold the principle of life, *corculum*, which communicates with them by means of two large trunks of vessels that supply it with nourishment, and correspond to the navel-string in animals; as the lobes themselves seem to answer the purpose of the placenta in women, and cotyledons in brutes, &c.

We said, in the definition, that the lobes are the perishable parts of the seed. To explain this we must previously

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previously observe the changes which are effected on the embryo plant in the first stages of vegetation. After lying some time in water or earth, the lobes of the seed, penetrated by the watery particles, which are charged with nutritive juices, put in motion by the heat, swell and thicken; the air, contained within their substance, dilating, bursts open the outer cover or husk which unites them, and discovers the radicle and embryo-plant. In this first stage the seed is said properly to sprout or germinate. Soon after, the lobes expanding, rise out of the earth in the form of leaves; very different, however, from those which the plant is afterwards to produce. In this stage the seed is properly said to rise. These leaves, called for distinction's sake *feminal* or *seed leaves*, (that is, the first leaves produced by the seeds), are commonly two in number: some seeds, however, have only one feminal leaf; in which case the plants, by botanists, are called *monocotyledonous*, a term of the same import; as those which rise with two feminal leaves are styled *dicotyledonous*. Cæsalpinus and Jungius termed both these kinds of seeds *uniovular* and *biovular*; that is, having one or two seed-covers. The former was the first who discovered the number of lobes in the embryo of seeds.—To proceed with our infant plant. Under this new form of leaves, the lobes elaborate and rectify the sap, which is destined to nourish the tender vegetable. The young root too, which naturally tends downwards, has by this time made some efforts to penetrate into the bosom of the earth, where meeting with strong exhilarating juices, it transmits them to the lobes, through which they pass, highly refined, to the future plant. The stem begins to appear; but, though enlarged in volume, its parts are not developed or unfolded, but continue as they were in the seed. The lobes still united to the plant by the two trunks of the vessels, accompany it for some time after its eruption from the earth, till, having acquired sufficient strength and growth, the feminal leaves become useless, wrinkle, wither, and die away. See GERMINATION.

Of plants which have only one feminal leaf, we must carefully distinguish those in which the lobe forms a sort of sheath surrounding the whole body of the plant, as in the palms, grasses, and liliaceous vegetables; from those in which the lobe is only extended in length, as in dodder. Pine, and fir-trees, says Linnæus, have ten; cypress, five; flax, four lobes: in fact, however, these plants have only two lobes, each of which is differently divided, almost to the base; the lobes only being perfectly distinct. The lobes being in the vegetable economy what the placenta is in the animal, their disposition at the time when the seed begins to grow, is termed very properly, by Linnæus, PLACENTATION.

In the mushrooms, ferns, and other imperfect plants, the feminal leaves are not sufficiently ascertained. The seeds of the mosses want only the proper coverings and lobes.

COTYTTIA, or COTYTTIS, in antiquity, a nocturnal festival in honour of *Cotys*, or *Cutyttia*, the goddess of wantonness.

COUCH, in painting, a term used for each lay or impression of colour, either in oil or water, wherewith

the painter covers his canvas, wall, waincot, or other matter to be painted.

Couch-Grass, in botany. See TRITICUM.

COUCHANT, in heraldry, is underfoot of a lion, or other beast, when lying down, but with his head raised; which distinguishes the posture of couchant from dormant, wherein he is supposed quite stretched out and asleep.

COUCHE, in heraldry, denotes any thing lying along: thus, chevron-couché, is a chevron lying sideways, with the two ends on each side of the shield, which should properly rest on the base.

COUCHING of a CATARACT, in surgery. See SURGERY.

COVENANT, in law, is the consent and agreement of two or more persons to do, or not to do, some act, or thing, contracted between them. Also it is the declaration the parties make, that they will stand to such agreement, relating to lands or other things; and is created by deed in writing, sealed and executed by the parties, or otherwise it may be implied in the contract as incident thereto. And if the persons do not perform their covenants, a writ or action of covenant is the remedy to recover damages for the breach of them.

COVENTRY, a town of Warwickshire in England, situated in W. Long. 1. 26. N. Lat. 52. 25. It is an ancient place, and is supposed to derive its name from a convent formerly situated here. Hither Robert de Limsey, bishop of Litchfield and Chester, removed his see, tempted, as it is said, by the wealth of the convent: however, the see returned in a short time to Litchfield again; but with this condition, that the bishop should be styled of Litchfield and Coventry. Leofric, earl of Mercia, who rebuilt the religious house after it had been destroyed by the Danes, and was lord of the place about the year 1040, is said, upon some provocation, to have loaded them with heavy taxes. Being importuned by his lady, Godiva, to remit them, he consented, upon condition that she should ride naked through the town, which he little imagined she would ever comply with. But he found himself mistaken: for she accepted the offer, and rode through the town with her long hair scattered all over her body; having first enjoined the citizens not to venture, on pain of death, to look out as she passed. It is said, however, that a certain taylor could not help peeping; and to this day there is an effigy of him at the window whence he looked. To commemorate this extraordinary transaction, and out of respect to the memory of their patroness, the citizens make a procession every year, with the figure of a naked woman on horseback. After Leofric's death, the earls of Chester became lords of the city, and granted it many privileges. At length it was annexed to the earldom of Cornwall; and growing considerable, had divers immunities and privileges conferred upon it by several kings, particularly that of a mayor and two bailiffs by Edward III.; and Henry VI. made it, in conjunction with some other towns and villages, a distinct county, independent of the county of Warwick. But afterwards Edward IV. for their disloyalty, deprived them of their liberties, which were not restored, till they had paid a fine of 500 merks. By a charter from
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James I. an alderman is allotted to each ward, with the powers of the justices of the peace within the city and its liberties. The walls were ordered to be demolished at the reformation; and now nothing remains of them but the gates, which are very lofty. Coventry is noted for the two parliaments which were held in it; the one called the parliament of *Dunces*, and the other of *Devils*. The former was so called on account of the exclusion of the lawyers; and the attainders of the duke of York, the earls of Salisbury, Warwick, and March, procured the other the epithet of *Devils*. The town-house of Coventry is much admired for its painted windows representing several kings and others that have been benefactors to the city. The chief manufactures carried on here are tennies and ribbands.

CO-VERSED SINE, in geometry, the remaining part of the diameter of a circle, after the versed sine is taken from it. See GEOMETRY.

COVERT-WAY, or CORRIDOR, in fortification, a space of ground, level with the field on the edge of the ditch, three or four fathoms broad, ranging quite round the half moons and other works toward the country. It has a parapet raised on a level, together with its banquetts and glacis. See FORTIFICATION.

COVERTURE, in law, is applied to the state and condition of a married woman, who is under the power of her husband, and therefore called *femme covert*.

COUGH, in medicine. See (Index subjoined to) MEDICINE.

COUGH, in farriery. See FARRIERY, § vi.

COVIN, a deceitful compact or agreement between two or more to deceive or prejudice a third person: As, if a tenant for life conspire with another, that this other shall recover the land which the tenant holds, in prejudice of him in reversion. Dr Skinner takes the word to be a corruption of the Latin *conventum*, and therefore writes it *coven*. See CONSPIRACY.

COVING, in building, is when houses are built, projecting over the ground-plot, and the turned pro-jecture arched with timber, lathed and plastered.

COULTER, in husbandry, an iron-instrument, fixed in the beam of a plough, and serving to cut the edge of each furrow. See AGRICULTURE, p. 143. col. 1.

COUNCIL, or COUNSEL, in a general sense, an assembly of divers considerable persons to concert measures relating to the state.

In Britain, the law, in order to assist the king in the discharge of his duties, the maintenance of his dignity, and the exertion of his prerogative, hath assigned him a diversity of councils to advise with.

1. The first of these is the high court of parliament. See PARLIAMENT.

2. The peers of the realm are by their birth hereditary counsellors of the crown; and may be called together by the king, to impart their advice in all matters of importance to the realm, either in time of parliament, or, which hath been their principal use, when there is no parliament in being. Accordingly, Bracton, speaking of the nobility of his time, says, they might properly be called, "consules a consulendo; reges enim tales sibi associant ad consulendum." And in the law-books it is laid down, that the peers are crea-

ted for two reasons: 1. *Ad consulendum*, 2. *Ad defendendum, regem*: for which reasons the law gives them certain great and high privileges; such as freedom from arrests, &c. even when no parliament is sitting; because the law intends, that they are always assisting the king with their counsel for the common-wealth, or keeping the realm in safety by their prowess and valour.

Instances of conventions of the peers, to advise the king, have been in former times very frequent; though now fallen into disuse, by reason of the more regular meetings of parliament. Sir Edward Coke gives us an extract of a record, 5 Henry IV. concerning an exchange of lands between the king and the earl of Northumberland, wherein the value of each was agreed to be settled by advice of parliament, (if any should be called before the feast of St Lucia), or otherwise by advice of the grand council of peers, which the king promises to assemble before the said feast, in case no parliament shall be called. Many other instances of this kind of meeting are to be found under our ancient kings: though the formal method of convoking them had been so long left off, that when king Charles I. in 1640, issued out writs under the great seal, to call a council of all the peers of England, to meet and attend his majesty at York, previous to the meeting of the long parliament, the earl of Clarendon mentions it as a new invention, not before heard of; that is, as he explains himself, so old, that it had not been practised in some hundreds of years. But though there had not for long before been an instance, nor has there been any since, of assembling them in so solemn a manner, yet, in cases of emergency, our princes have at several times thought proper to call for, and consult as many of the nobility as could easily be brought together: as was particularly the case with king James II. after the landing of the prince of Orange; and with the prince of Orange himself, before he called the convention parliament which afterwards called him to the throne.

Besides this general meeting, it is usually looked upon to be the right of each particular peer of the realm, to demand an audience of the king, and to lay before him with decency and respect such matters as he shall judge of importance to the public weal. And therefore, in the reign of Edward II. it was made an article of impeachment in parliament against the two Hugh Spencers, father and son, for which they were banished the kingdom, "that they by their evil covin would not suffer the great men of the realm, the king's good counsellors, to speak with the king, or to come near him; but only in presence and hearing of said Hugh the father, and Hugh the son, or one of them, and at their will, and according to such things as pleased them."

3. A third council belonging to the king, are, according to Sir Edward Coke, his judges of the courts of law, for law-matters. And this appears frequently in the English statutes, particularly 14 Edward III. c. 5. and in other books of law. So that when the king's council is mentioned generally, it must be defined, particularized, and understood, *secundum subjectam materiam*; "according to the subject matter:" and if the subject be of a legal nature, then by the king's

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Council. king's council is undertook his council for matters of law; namely, his judges. Therefore, when by statute 16 Richard II. c. 5. it was made a high offence to import into England any papal bulls, or other processes from Rome; and it was enacted, that the offenders should be attached by their bodies, and brought before the king and his council to answer for such offence; here, by the expression of king's council, were understood the king's judges of his courts of justice, the subject-matter being legal: this being the general way of interpreting the word council.

4. But the principal council belonging to the king is his *privy council*, which is generally, by way of eminence, called the council. And this, according to Sir Edward Coke's description of it, is a noble, honourable, and reverend assembly, of the king, and such as he wills to be of his privy council, in the king's court or palace. The king's will is the sole constituent of a privy councillor; and this also regulates their number, which was anciently twelve, or thereabouts. Afterwards it increased to so large a number, that it was found inconvenient for secrecy and dispatch; and therefore, king Charles II. in 1679, limited it to 30: whereof 15 were to be the principal officers of state, and those to be counsellors *virtute officii*; and the other 15 were composed of ten lords and five commoners of the king's choosing. But since that time the number has been much augmented, and now continues indefinite. At the same time also, the ancient office of lord president of the council was revived in the person of Anthony earl of Shaftesbury; an officer that by the statute of 31 Henry VIII. c. 10. has precedence next after the chancellor and lord treasurer.

Privy counsellors are made by the king's nomination, without either patent or grant; and, on taking the necessary oaths they become immediately privy counsellors during the life of the king that chooses them, but subject to removal at his discretion.

As to the qualifications of members to sit at this board; any natural subject of England is capable of being a member of the privy council; taking the proper oaths for the security of government, and the test for security of the church. But, in order to prevent any persons under foreign attachments from insinuating themselves into this important trust, as happened in the reign of king William in many instances, it is enacted, by the act of settlement, that no person born out of the dominions of the crown of England unless born of English parents, even tho' naturalized by parliament, shall be capable of being of the privy council.

The duty of a privy councillor appears from the oath of office, which consists of seven articles: 1. To advise the king according to the best of his cunning and discretion. 2. To advise for the king's honour, and good of the public, without partiality through affection, love, meed, doubt, or dread. 3. To keep the king's counsel secret. 4. To avoid corruption. 5. To help and strengthen the execution of what shall be there resolved. 6. To withstand all persons who would attempt the contrary. And lastly, in general, to observe, keep, and do all that a good and true counsellor ought to do to his sovereign lord.

The power of the privy council is to inquire into all offences against the government, and to commit

the offenders to safe custody, in order to take their trial in some of the courts of law. But their jurisdiction herein is only to inquire, and not to punish: and the persons committed by them are intitled to their *habeas corpus* by statute 16 Car. I. c. 10. as much as if committed by an ordinary justice of the peace. And, by the same statute, the court of star-chamber, and the court of requests, both of which consisted of privy-counsellors, were dissolved; and it was declared illegal for them to take cognizance of any matter of property belonging to the subjects of this kingdom. But, in plantation or admiralty causes, which arise out of the jurisdiction of this kingdom; and in matters of lunacy and idiocy, being a special flower of the prerogative; with regard to these, although they may eventually involve questions of extensive property, the privy council continues to have cognizance, being the court of appeal in such cases; or rather, the appeal lies to the king's majesty himself in council. Whenever also a question arises between two provinces in America or elsewhere, as concerning the extent of their charters and the like, the king in his council exercises original jurisdiction therein, upon the principles of feudal sovereignty. And so likewise when any person claims an island or a province, in the nature of a feudal principality, by a grant from the king or his ancestors, the determination of that right belongs to his majesty in council: as was the case of the earl of Derby with regard to the isle of Man in the reign of queen Elizabeth; and of the earl of Cardigan and others, as representatives of the duke of Montague, with relation to the island of St Vincent in 1764. But from all the dominions of the crown, excepting Great Britain and Ireland, an *appellate* jurisdiction (in the last resort) is vested in the same tribunal; which usually exercises its judicial authority in a committee of the whole privy council, who hear the allegations and proofs, and make their report to his majesty in council, by whom the judgment is finally given.

The privileges of privy counsellors as such, consist principally in the security which the law has given them against attempts and conspiracies to take away their lives. For, by statute 3 Hen. VII. c. 14. if any of the king's servants of his household conspire to take away the life of a privy counsellor, it is felony, though nothing be done upon it. And the reason of making this statute, Sir Edward Coke tells us, was, because such servants have greater and readier means, either by night or by day, to destroy such as be of great authority and near about the king; and such a conspiracy was, just before this parliament, made by some of king Henry the seventh's household servants, and great mischief was like to have ensued thereupon. This extends only to the king's menial servants. But the statute 9 Anne, c. 16. goes farther, and enacts, that any person that shall unlawfully attempt to kill, or shall unlawfully assault and strike, or wound, any privy counsellor in the execution of his office, shall be a felon without benefit of clergy. This statute was made upon the daring attempt of the Sieur Guiscard, who stabbed Mr Harley, afterwards earl of Oxford, with a penknife, when under examination for high crimes in a committee of the privy council.

The dissolution of the privy council depends upon the

the king's pleasure; and he may, whenever he thinks proper, discharge any particular member, or the whole of it, and appoint another. By the common law also it was dissolved *ipso facto*, by the king's demise; as deriving all its authority from him. But now, to prevent the inconveniences of having no council in being on the accession of a new prince, it is enacted by statute 6 Anne, c. 7. that the privy council shall continue for six months after the demise of the crown, unless sooner determined by the successor.

Aulic COUNCIL. See *AULIC*.

Cabinet COUNCIL, the same with *Privy COUNCIL*.

Common COUNCIL, in the city of London, is a court wherein are made all bye-laws which bind the citizens. It consists, like the parliament, of two houses; an upper, composed of the lord mayor and aldermen; and a lower, of a number of common-council men, chosen by the several wards, as representatives of the body of the citizens.

Privy COUNCIL, the *primum mobile* of the civil government of Great Britain, bearing part of that great weight in the government which otherwise would be too heavy upon the king. See *COUNCIL*, *supra*, n^o 4.

COUNCIL of War, an assembly of the principal officers of an army or fleet, occasionally called by the general or admiral to concert measures for their conduct with regard to sieges, retreats, engagements, &c.

COUNCIL, in church-history, an assembly of prelates and doctors, met for the regulating matters relating to the doctrine or discipline of the church.

National COUNCIL, is an assembly of prelates of a nation under their primate or patriarch.

Oecumenical or General COUNCIL, is an assembly which represents the whole body of the universal church. The Romanists reckon eighteen of them; Bullinger, in his treatise de Conciliis, six; Dr Prideaux, seven; and bishop Beveridge has increased the number to eight, which, he says, are all the general councils which have ever been held since the time of the first Christian emperor. They are as follows: 1. The council of Nice, held in the reign of Constantine the Great, on account of the heresy of Arius. 2. The council of Constantinople, called under the reign and by the command of Theodosius the Great, for much the same end that the former council was summoned. 3. The council of Ephesus, convened by Theodosius the younger, at the suit of Nestorius. 4. The council of Calcedon, held in the reign of Marcian, which approved of the Eutychian heresy. 5. The second council of Constantinople, assembled by the emperor Justinian, condemned the three chapters taken out of the book of Theodorus of Mopsuestia, having first decided that it was lawful to anathematize the dead. Some authors tell us, that they likewise condemned the several errors of Origen about the Trinity, the plurality of worlds, and pre-existence of souls. 6. The third council of Constantinople, held by the command of Constantine Pogonatus the emperor, in which they received the definitions of the five first general councils, and particularly that against Origen and Theodorus of Mopsuestia. 7. The second Nicene council. 8. The fourth council of Constantinople, assembled when Lewis II. was emperor of the West. The regulations which they made are contained in twenty-seven canons, the

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heads of which are set down by M. du Pin, to whom the reader is referred.

COUNSEL, in a general sense, signifies advice or instruction how to behave in any difficult matter.

COUNSEL, or *Advocates*, in English courts of law, are of two species or degrees; *BARRISTERS* and *SERJEANTS*. See these articles.

From both these degrees some are usually selected to be his majesty's counsel, learned in the law; the two principal of whom are called his *attorney-general*, and *solicitor-general*. The first king's counsel, under the degree of serjeant, was Sir Francis Bacon, who was made so, *honoris causa*, without either patent or fee: so that the first of the modern order (who are now the sworn servants of the crown, with a standing salary) seems to have been Sir Francis North, afterwards lord keeper of the Great Seal to king Charles II. These king's counsel answer, in some degree, to the advocates of the revenue, *advocati fisci*, among the Romans. For they must not be employed in any cause against the crown without special licence; in which restriction they agree with the advocates of the fisc: but, in the imperial law, the prohibition was carried still farther, and perhaps was more for the dignity of the sovereign; for, excepting some peculiar causes, the fiscal advocates were not permitted to be at all concerned in private suits between subject and subject. A custom has of late years prevailed of granting letters-patent of precedence to such barristers as the crown thinks proper to honour with that mark of distinction: whereby they are entitled to such rank and precedence as are assigned in their respective patents; sometimes next after the king's attorney-general, but usually next after his majesty's counsel next being. These, as well as the queen's attorney and solicitor-general, rank promiscuously with the king's counsel; and, together with them, sit within the bar of their respective courts: but receive no salaries, and are not sworn; and therefore are at liberty to be retained in causes against the crown.

And all other serjeants and barristers indiscriminately, (except in the court of common-pleas, where only serjeants are admitted), may take upon them the protection and defence of any suitors, whether plaintiff or defendant; who are therefore called their *clients*; like the dependents on the ancient Roman orators. These indeed practised *gratis*, for honour merely, or at most for the sake of gaining influence: and so likewise it is established with us, that a counsel can maintain no action for his fees; which are given, not as *locatio vel conductio*, but as *quiddam honorarium*; not as a salary or hire, but as a mere gratuity, which a counsellor cannot demand without doing wrong to his reputation; as is also laid down with regard to advocates in the civil law, whose *honorarium* was directed, by a decree of the senate, not to exceed in any case 10,000 sesterces, or about 80l. of English money. And in order to encourage due freedom of speech in the lawful defence of their clients; and at the same time to check the unseemly licentiousness of prostitute and illiberal men (a few of whom may sometimes insinuate themselves even into the most honourable professions), it hath been holden that a counsel is not answerable for any matter by him spoken, relative to the cause in hand, and suggested in the client's instructions; altho'

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it should reflect upon the reputation of another, and even prove absolutely groundless; but if he mentions an untruth of his own invention, or even upon instructions, if it be impertinent to the cause in hand, he is then liable to an action from the party injured. And counsel guilty of deceit and collusion are punishable by the statute Westm. 1. 3 Edw. 1. c. 28. with imprisonment for a year and a day, and perpetual silence in the courts: a punishment still sometimes inflicted for gross misdemeanours in practice.

COUNSELLOR, in general, a person who advises another: thus we say, a counsellor at law, a privy counsellor, &c.

COUNSELLOR at Law, a person retained by a client to plead his cause in a public court of judicature.

COUNT, a title of foreign nobility, which answers to that of earl among us. Counts *palatine* were formerly such as had an office in the king's palace, as appears by their titles; but counts palatine in England were such as had regal power within their own jurisdiction. Counts were originally lords of the court, or of the emperor's retinue; and had their name *comites*, a *comitendo*.

In the courts of the Roman emperors, from Augustus downwards, there were certain counsellors who attended the emperor both at home and abroad, to assist him with their advice upon all occasions. These counsellors were styled *comites augustales*, or *comites augusti*, "companions of the emperor," from their constant attendance on his person. They were divided into three orders or degrees, and those of each order had certain privileges and appointments while they attended the imperial court. As these *comites* or companions had frequent access to the emperors, they often stood high in their favour; and obtained from them the government of provinces, towns, forts, and castles, and other offices of profit and honour. When they left the Imperial court, in order to take upon them their respective governments, they then changed their general title of *comites augustales*, for one taken from the particular government to which they were appointed. Such were the counts of Britain, and of the Saxon shire in Britain.

COUNT-Wheel, in the striking part of a clock, a wheel which moves round once in 12 or 24 hours. It is sometimes called the *locking-wheel*.

COUNTER, a term which enters into the composition of diverse words of our language, and generally implies opposition; but when applied to deeds, means an exact copy kept of the contrary party, and sometimes signed by both parties.

COUNTER-Changed, in heraldry, the intermixture, or opposition of any metal with a colour. See *HERALDRY*, n° 30. Examp. 17, 18, &c.

COUNTER-Flory, in heraldry, is said of a tressure whose flower-de-luce are opposite to others. *Ibid.* n° 40. Examp. 7.

COUNTER-Drawing, in painting, is the copying a design, or painting; by means of a fine linen-cloth, an oiled paper, or other transparent matter, where the strokes appearing through are followed with a pencil, with or without colour. Sometimes it is done on glass, and with frames or nets divided into squares with silk or with thread, and also by means of instru-

ments invented for the purpose, as the parallelogram.

COUNTER-Ermine, in heraldry, is the contrary of ermine, being a black field with white spots.

COUNTERFEITS, in law, are persons that obtain any money or goods by counterfeit letters or false tokens, who being convicted before justices of assize or of the peace, &c. are to suffer such punishment as shall be thought fit to be inflicted under death, as imprisonments, pillory, &c.

COUNTER-FOIL, or **COUNTER-STOCK**, in the exchequer, that part of tally which is kept by an officer of the court.

COUNTER-Guard, in fortification, is a work raised before the point of a bastion, consisting of too long faces parallel to the faces of the bastion, making a salient angle: they are sometimes of other shapes, or otherwise situated.

COUNTER-Light, or **Counter-jour**, a light opposite to any thing, which makes it appear to disadvantage. A single counter-light is sufficient to take away all the beauty of a fine painting.

COUNTER-March, in military affairs, a change of the face or wings of a battalion, by which means those that were in the front come to be in the rear. It also signifies returning, or marching back again.

COUNTER-Mine, in war, a well and gallery drove and sunk till it meet the enemy's mine to prevent its effect.

COUNTER-Paled, in heraldry, is when the escutcheon is divided into twelve pales parted per fesse, the two colours being counter-changed; so that the upper are of one colour, and the lower of another.

COUNTER-Part, in music, denotes one part to be applied to another. Thus the bass is said to be a counter-part to the treble.

COUNTER-Passant, in heraldry, is when two lions are in a coat of arms, and the one seems to go quite the contrary way from the other.

COUNTER-Point, in music: a term derived from the Latin preposition *contra*, and the verb *pungere*; because the musical characters by which the notes in each part are signified are placed in such a manner each with respect to each as to shew how the parts answer one another. See *COMPOSITION*.

COUNTER-Pointed, (*Contre-pointé*), in heraldry, is when two chevrons in one escutcheon meet in the points, the one rising as usual from the base, and the other inverted falling from the chief; so that they are counter to one another in the points. They may also be counter-pointed when they are founded upon the sides of the shield, and the points meet that way, called *counter-pointed in fesse*.

COUNTERPOISE, in the manage, is the liberty of the action and feat of a horse-man; so that in all the motions made by the horse, he does not incline his body more to one side than to the other, but continues in the middle of the saddle, being equally on his stirrups, in order to give the horse the proper and seasonable aids.

COUNTER-POTENT, (*Contre-potencé*), in heraldry, is reckoned a fur as well as vair and ermine; but composed of such pieces as represent the tops of crutches, called in French *potences*, and in old English *potents*.

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COUNTER-Proof, in rolling-press printing, a print taken off from another fresh printed; which by being passed through the press, gives the figure of the former, but inverted. To counter-prove, is also to pass a design in black lead, or red chalk, through the press, after having moistened with a sponge both that and the paper on which the counter-proof is to be taken.

COUNTER-Quartered, (*contre-ecartelé*), in heraldry, denotes the escutcheon, after being quartered, to have each quarter again divided into two.

COUNTER-Salient, is when two beasts are borne in a coat leaping from each other directly the contrary way.

COUNTER-Scarp, in fortification, is properly the exterior talus or slope of the ditch; but it is often taken for the covered way and the glacis. In this sense we say, the enemy have lodged themselves on the counter-scarp. *Angle of the Counter-scarp*, is that made by two sides of the counter-scarp meeting before the middle of the curtain.

COUNTER-Signing, the signing the writing of a superior in quality of secretary. Thus charters are signed by the king, and counter-signed by a secretary of state, or lord chancellor.

COUNTER-Time, in the menage, is the defence or resistance of a horse that interrupts his cadence, and the measure of his menage, occasioned either by a bad horseman, or by the malice of the horse.

COUNTER, is also the name of a counting-board in a shop, and of a piece of metal with a stamp on it, used in playing at cards.

COUNTER of a Horse, that part of a horse's forehead which lies between the shoulders and under the neck.

COUNTERS in a Ship, are two. 1. The hollow arching from the gallery to the lower part of the straight piece of the stern, is called the *upper-counter*. 2. The lower-counter is between the transom and the lower part of the gallery.

COUNTER, is also the name of two prisons in the city of London, *viz.* the Poultry and Woodstreet.

COUNTY, among geographers, is used indifferently to denote either a kingdom, province, or lesser district. But its most frequent use is in contradistinction to town.

COUNTY, in geography, originally signified the territory of a count or earl, but now it is used in the same sense with **SHIRE**.

COUNTY-Court, in English law, a court incident to the jurisdiction of the sheriff. It is not a court of record, but may hold pleas of debt or damages under the value of 40s. Over some of which causes these inferior courts have, by the express words of the statute of Gloucester, a jurisdiction totally exclusive of the king's superior courts. For in order to be entitled to sue an action of trespass for goods before the king's justices, the plaintiff is directed to make affidavit that the cause of action does really and *bona fide* amount to 40s. which affidavit is now unaccountably disused, except in the court of exchequer. The statute also 43 Eliz. c. 6. which gives the judges in many personal actions, where the jury assess less damages than 40s. a power to certify the same and abridge the plaintiff of his full costs, was also meant to pre-

vent vexation by litigious plaintiffs; who, for purposes of mere oppression, might be inclined to institute such suits in the superior courts for injuries of a trifling value. The county-court may also hold plea of many real actions, and of all personal actions to any amount, by virtue of a special writ called a *justicies*; which is a writ empowering the sheriff for the sake of dispatch to do the same justice in his county-court, as might otherwise be had at Westminster. The freeholders of the county are the real judges in this court, and the sheriff is the ministerial officer. The great conflux of freeholders, which are supposed always to attend at the county-court, (which Spelman calls *forum plebeie justitie et theatrum comitatus potestatis*), is the reason why all acts of parliament at the end of every session were wont to be there published by the sheriff; why all outlawries of absconding offenders are there proclaimed; and why all popular elections which the freeholders are to make, as formerly of sheriffs and conservators of the peace, and fill of coroners, verderors, and knights of the shire, must ever be made in *pleno comitatu*, or, in full county-court. By the statute 2 Edw. VI. c. 25. no county-court shall be adjourned longer than for one month, consisting of 28 days. And this was also the ancient usage, as appears from the laws of king Edward the elder: "*prepositus* (that is, the sheriff) *ad quartam circiter septimanam frequentem populi concionem celebrato; cuique jus dicito; litesque singulas dirimito.*" In those times the county-court was a court of great dignity and splendor, the bishop and the alldorman (or earl) with the principal men of the shire sitting therein to administer justice both in lay and ecclesiastical causes. But its dignity was much impaired, when the bishop was prohibited, and the earl neglected to attend it. And, in modern times, as proceedings are removable from hence into the king's superior courts, by writ of *pone* or *recordare*, in the same manner as from hundred-courts, and courts-baron; and as the same writ of false judgment may be had, in nature of a writ of error; this has occasioned the same disuse of bringing actions therein.

COUPAR, the name of two towns of Scotland, the one situated about 12 miles north-east of Perth, in the shire of Angus, W. Long. 3. 0. N. Lat. 56. 30.; and the other in the county of Fife, about 10 miles west of St Andrews: W. Long. 2. 40. N. Lat. 56. 20.

COUPED, in heraldry, is used to express the head, or any limb, of an animal, cut off from the trunk, smooth; distinguishing it from that which is called *crasped*, that is, forcibly torn off, and therefore is ragged and uneven.

COUPED, is also used to signify such crosses, bars, bends, chevrons, &c. as do not touch the sides of the escutcheon, but are, as it were, cut off from them.

COUPLE-CLOSS, in heraldry, the fourth part of a chevron, never borne but in pairs, except there be a chevron between them, faith Guillim, though Bloom gives an instance to the contrary.

COUPLET, a division of a hymn, ode, song, &c. wherein an equal number, or equal measure, of verses is found in each part; which divisions, in odes, are called *strophes*.—**Couplet**, in an abuse of the word, is frequently made to signify a couple of verses.

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COURAP, the modern name for a distemper very common in Java and other parts of the East-Indies. It is a sort of herpes or itch on the arm-pits, groins, breast, and face: the itching is almost perpetual; and the scratching is followed by great pain, and a discharge of matter, which makes the linen stick to the skin as not easily to be separated without tearing off the crust. *Courap* is a general name for any sort of itch; but this distemper is thus called by way of eminence. It is so contagious that few escape it. For the cure, gentle and repeated purging is used, and externally the sublimate in a small quantity is a good topic.

COURIER, a messenger sent post, or express, to carry dispatches.

COURLAND, a duchy situated between E. Long. 21. 26. and between N. Lat. 56. 30. and 57. 30. It is bounded by the river Dwina, which divides it from Livonia, on the north; by Lithuania, on the east; by Samogitia, on the south; and by the Baltic sea on the west; being 130 miles long, and 30 broad.

COURSE, (*fronts*), in navigation, the angle contained between the nearest meridian and that point of the compass upon which a ship sails in any particular direction.

COURSES, a name by which the principal sails of a ship are distinguished, *viz.* the main-sail, the fore-sail, and the mizen: the mizen-stay-sail and fore-sail are also sometimes comprehended in this denomination; as are the main-stay-sails of all brigs and schooners. See *SAIL*.

COURSING. There are three several sorts of courfes with gre-hounds: 1. At the hare; 2. At the fox; and, 3. At the deer.

For the *deer*, there are two sorts of courfes; the one in the paddock, the other either in the forest or the park. For the paddock courfe, there must be the gre-hound and the terrier, and the mongrel gre-hound, whose business it is to drive away the deer before the gre-hounds are slipped; a brace or a leash are the usual number slipped at a time, seldom at the utmost more than two brace. In courfing the deer in the forest, or park, there are two ways in use: the one is courfing from wood to wood; and the other, upon the lawns close by the keeper's lodge. In the courfing from wood to wood, the way is to throw in some young hounds into the wood to bring out the deer; and if any deer come out that is not weighty, or a deer or antler which is buck, fore, or sorrel, then you are not to slip your gre-hounds, which are held at the end of the wood, where the keepers, who can guess very well on these occasions, expect that the deer will come out. If a proper deer come out, and it is suspected that the brace or leash of gre-hounds slipped after him will not be able to kill him, it is proper to waylay him with a couple of fresh gre-hounds.

The courfing upon the lawn is the most agreeable of all other ways. When the keeper has notice of this, he will lodge a deer for the courfe; and then, by coming under the wind, the gre-hound may be brought near enough to be slipped for a fair courfe.

The best method of courfing the *hare*, is to go out and find a hare sitting; which is easily done in the

summer, by walking across the lands, either stubble, fallow, or corn grounds, and casting the eye up and down: for in summer they frequent those places for fear of the ticks, which are common in the woods at that season; and in autumn the rains falling from the trees offend them. The rest of the year there is more trouble required; as the bushes and thickets must be beat to rouse them, and oftentimes they will lie so close, that they will not stir till the pole almost touches them: the sportsmen are always pleased with this, as it promises a good courfe. If a hare lies near any close or covert, and with her head that way, it is always to be expected that she will take to that immediately on being put up; all the company are therefore to ride up and put themselves between her and the covert before she is put up, that she may take the other way, and run upon open ground. When a hare is put up, it is always proper to give her ground, or *law*, as it is called; that is, to let her run 12 score yards, or thereabouts, before the gre-hounds are slipped at her; otherwise she is killed too soon, the greater part of the sport is thrown away, and the pleasure of observing the several turnings and windings that the creature will make to get away is all lost. A good sportsman had rather see a hare save herself after a fair courfe, than see her murdered by the gre-hounds as soon as she is up.

In courfing the *fox*, no other art is required, than standing close, and in a clear wind, on the outside of some grove where it is expected he will come out; and when he is come out, he must have head enough allowed him, otherwise he will return back to the covert. The slowest gre-hound will be able to overtake him, after all the odds of distance necessary; and the only danger is the spoiling the dog by the fox, which too frequently happens. For this reason, no gre-hound of any value should be run at this courfe; but the strong, hard, bitter dogs, that will seize any thing.

The laws of courfing established by the duke of Norfolk, and other sportsmen of the kingdom of England, are these:

1. He that is chosen sewerer, or letter loose of the dogs, shall receive the gre-hounds matched to run together into his leash, as soon as he comes into the field; he is to march next to the hare-finder, or him who is to start the hare, until he come to the form; and no horseman or footman is to go before or sideways, but all straight behind, for the space of about 40 yards.
2. A hare ought never to be courfed with more than a brace of gre-hounds.
3. The hare-finder is to give the hare three shoes before he puts her up from her form or seat, to the end that the dogs may be prepared and attend her starting.
4. If there be not a particular danger of losing the hare, she should have about twelve score yards law.
5. The dog that gives the first turn, if after that there be neither cote, slip, nor wrench, wins the wager.
6. A go-by, or bearing the hare, is accounted equivalent to two turns.
7. If neither dog turns the hare, he that leads to the last covert wins.
8. If any dog turns the hare, serves himself, and turns her again, it is as much as a cote, and a cote is esteemed as much as two turns.
9. If all the courfe be equal, he that bears

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the hare shall win; and if he be not borne, the course shall then be judged *dead*. 10. If a dog take a fall in his course, and yet perform his part, he may challenge the advantage of a turn more than he gave. 11. If a dog turn the hare, serve himself, and give divers cotes, and yet in the end shall stand still in the field, the other dog, if he turns home to the covert, although he gives no other, shall be adjudged to win the wager. 12. If by misfortune a dog be rid over in the course, that course shall be adjudged void, and he that did the mischief is to make reparation to the owner. 13. If a dog gives the first and last turn, and there be no other advantage betwixt them, he that gives the odd turn wins. 14. A cote is when a greyhound goes end-ways by the side of his fellow, and gives the hare a turn. 15. A cote serves for two turns, and two trippings or jerkings for a cote; and if the hare turns not quite about, the only *wrencheth*, in the sportsman's phrase. 16. If there be no cotes given by either of the greyhounds, and one serves the other at turning, then he that gives the most turns wins the wager. 17. Sometimes a hare does not turn, but wrenches; for she does not turn, except she turn as it were round. In these cases, two wrenches stand for one turn. 18. He that comes in first at the death of the hare takes her up, and saves her from breaking; he cherishes the dogs, and cleanses their mouths from the wool; he is adjudged to have the hare for his pains. 19. Finally, those who are judges of the leash, must give their judgement before they depart out of the field, or else it is not to stand as valid.

COURT, an appendage to a house or habitation; consisting of a piece of ground inclosed with walls, but open upwards.

COURT is also used for the palace, or place where a king or sovereign prince resides.

COURT, in a law-sense, is defined to be a place wherein justice is judicially administered. And, as by our excellent constitution the sole executive power of the laws is vested in the person of the king, it will follow that all courts of justice, which are the medium by which he administers the laws, are derived from the power of the crown. For whether created by act of parliament, or letters patent, or subsisting by prescription, (the only methods by which any court of judicature can exist), the king's consent in the two former is expressly, and in the latter impliedly, given. In all these courts, the king is supposed in contemplation of law to be always present; but as that is in fact impossible, he is there represented by his judges, whose power is only an emanation of the royal prerogative.

For the more speedy, universal, and impartial administration of justice between subject and subject, the law hath appointed a prodigious variety of courts, some with a more limited, others with a more extensive jurisdiction; some constituted to inquire only, others to hear and determine; some to determine in the first instance, others upon appeal and by way of review. See *LAW*, n^o xcvi. xcix. c. cxli. clvi. clvii. clviii. and the respective articles in the order of the alphabet. One distinction may be here mentioned, that runs throughout them all; viz. that some of them are courts of *record*, others *not of record*. A court of record is that where the acts and judicial proceedings are

enrolled in parchment for a perpetual memorial and testimony: which rolls are called the records of the court, and are of such high and supereminent authority, that their truth is not to be called in question. For it is a settled rule and maxim, that nothing shall be averred against a record, nor shall any plea, or even proof, be admitted to the contrary. And if the existence of a record be denied, it shall be tried by nothing but itself; that is, upon bare inspection whether there be any such record or no; else there would be no end of disputes. But, if there appear any mistake of the clerk in making up such record, the court will direct him to amend it. All courts of record are the king's courts, in right of his crown and royal dignity, and therefore no other court hath authority to fine or imprison; so that the very erection of a new jurisdiction with power of fine or imprisonment makes it instantly a court of record.—A court not of record is the court of a private man; whom the law will not intrust with any discretionary power over the fortune or liberty of his fellow-subjects. Such are the courts-baron incident to every manor, and other inferior jurisdictions: where the proceedings are not enrolled or recorded; but as well their existence as the truth of the matters therein contained shall, if disputed, be tried and determined by a jury. These courts can hold no plea of matters cognizable by the common law, unless under the value of 40s.; nor of any forcible injury whatsoever, not having any process to arrest the person of the defendant.

In every court there must be at least three constituent parts, the *actor*, *reus*, and *judex*: the *actor*, or plaintiff, who complains of an injury done; the *reus*, or defendant, who is called upon to make satisfaction for it; and the *judex*, or judicial power, which is to examine the truth of the fact, to determine the law arising upon that fact, and, if any injury appears to have been done, to ascertain and by its officers to apply the remedy. It is also usual in the superior courts to have attorneys, and advocates or counsel, as assistants. See *ATTORNEY*, and *COUNSEL*.

COURT-BARON, in English law, a court incident to every manor in the kingdom, to be held by the steward within the said manor. This court-baron is of two natures: the one is a customary court, appertaining entirely to the copyholders, in which their estates are transferred by surrender and admittance, and other matters transacted relative to their tenures only. The other is a court of common law, and it is the court of the *barons*, by which name the freeholders were sometimes anciently called: for that it is held before the freeholders who owe suit and service to the manor, the steward being rather the registrar than the judge. These courts, though in their nature distinct, are frequently confounded together. The court we are now considering, viz. the freeholder's court, was composed of the lord's tenants, who were the *pares* of each other, and were bound by their feudal tenure to assist their lord in the dispensation of domestic justice. This was formerly held every three weeks; and its most important business is to determine, by writ of right, all controversies relating to the right of lands within the manor. It may also hold plea of any personal actions, of debt, trespass on the case, or the like,

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like, where the debt or damages do not amount to 40s. Which is the same sum, or three marks, that bounded the jurisdiction of the ancient Gothic courts in their lowest instance, or *ferding-courts*, so called because four were instituted within every superior district or hundred. But the proceedings on a writ of right may be removed into the county-court by a precept from the sheriff called a *tolt*, "*quia tollit atque eximit causam e curia baronum*." And the proceedings in all other actions may be removed into the superior courts by the king's writs of *pone*, or *accedas ad curiam*, according to the nature of the suit. After judgment given, a writ also of *false judgment* lies to the courts at Westminster to rehear and review the cause, and not a writ of *error*; for this is not a court of record: and therefore, in some of these writs of removal, the first direction given is to cause the plaintiff to be recorded, *recordari facias loquissam*.

Baron-Court, in Scots law. See **LAW**, n° clviii. 12. 13, 14.

Court-Martial, a court appointed for the punishing offences in officers, soldiers, and sailors, the powers of which are regulated by the mutiny-bill.

COURTESY, or **CURTSEY**, of *England*; a certain tenure whereby a man marrying an heiress seized of lands of fee-simple, or fee-tail general, or seized as heir of the tail special, and getteth a child by her that cometh alive into the world, though both it and his wife die forthwith; yet, if she were in possession, he shall keep the land during his life, and is called *tenant per legem Anglie*, "or tenant by the courtesy of England;" because this privilege is not allowed in any country except Scotland, where it is called *curialitas Scotie*.

COURTESAN, a woman who prostitutes herself for hire, especially to people of superior rank. *Lais*, the famous Theban courtesan, stands on record for requiring no less than 10,000 crowns for a single night. Of all places in the world, Venice is that where courtesans abound the most. It is now 300 years since the senate, which had expelled them, was obliged to recall them; to provide for the security of women of honour, and to keep the nobles employed lest they should turn their heads to make innovations in the state.

COURTRAY, a town of the Austrian Netherlands, situated on the river Lys, about 23 miles south-west of Ghent, and fourteen east of Ypres. E. Long. 3. 10. N. Lat. 50. 48.

COUSIN, a term of relation between the children of brothers and sisters, who in the first generation are called cousin-germans, in the second generation second-cousins, &c. If sprung from the relations of the father's side, they are denominated *paternal* cousins; if on the mother's, *maternal*.

COUSIN (John), a celebrated French painter, who excelled in painting on glass. His picture of the last judgment, in the vestry of the Minims of the Wood of Vincennes, is much admired. He was also a good sculptor. He wrote several works on geometry and perspective; and died after the year 1689.

COSU, in heraldry, signifies a piece of another colour or metal placed on the ordinary, as if it were sewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COVERT, in heraldry, denotes something like a piece of hanging, or a pavilion falling over the top of a chief or other ordinary, so as not to hide, but only to be a covering to it.

COW, in zoology. See **BOS**.

Sea-Cow, in zoology. See **TRICHECTS**.

Cow-Itch, or **Couage**, in botany. See **DOLICHOS**.

Cow's-Lip, in botany. See **PRIMULA**.

COWARD, in heraldry, a term given to a lion borne in an escutcheon with his tail doubled or turned in between his legs.

COWEL (Dr John), a learned and eminent civilian, born about the year 1554. In 1607 he compiled a *Law Dictionary*, which gave great offence to Sir Edward Coke and the common lawyers; so that they first accused him to James I. as asserting that the king's prerogative was in some cases limited; and when they failed in that attempt, they complained of him to the house of commons, as a betrayer of the rights of the people, by asserting that the king was not bound by the laws: for which he was committed to custody, and his book publicly burnt. He also published *Institutiones Juris Anglicani*, in the manner of Justinian's Institutes: and died of the operation for the stone, in 1611.

COWES, a town and harbour on the north-east coast of the Isle of Wight, in Hampshire. It has no market, but is the best place for trade in the whole island; but as it lies low, the air is accounted unhealthy. It is eight miles south-east of Portsmouth. W. Long. 1. 25. N. Lat. 50. 45.

COWL, or **COUL**, a habit worn by the Bernardines and Benedictines, of which there are two kinds; one white, very large, worn in ceremonies; the other black, worn on ordinary occasions, in the streets, &c.

Friar's Cowl, in botany. See **ARISARUM**.

COWLEY (Abraham), was born at London 1618. His father, who was a grocer, dying before he was born, his mother procured him to be admitted a king's scholar at Westminster. His first inclination to poetry arose on his lighting on Spenser's *Fairy Queen*, when he was but just able to read: and this inclination so far improved in him, that at 13 he began to write several poems; a collection of which was published in 1613, when he was but 15. But one thing extremely remarkable in him was, that with so extraordinary a natural genius, he had so bad a memory that his teachers could never bring him to retain even the common rules of grammar. So that he not formed the most intimate acquaintance with the books themselves from which these rules are drawn, he could never have been master of them. In 1636 he was elected a scholar of Trinity College, Cambridge, and removed to that university. Here he went thro' all his exercises with a remarkable degree of reputation; and at the same time must have pursued his poetical turn with great eagerness, as it appears that the greatest part of his poems were written before he left that university. He had taken his degree of Master of Arts before 1643, when, in consequence of the turbulence of the times, he, among many others, was ejected from the college: whereupon, retiring to Oxford, he entered himself of St John's college; and that very year, under the denomination of a *scholar*

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lar of Oxford, published a satire called *The Puritan and the Papist*. It is apparent, however, that he did not remain very long at Oxford: for his zeal to the royal cause engaging him in the service of the king, who was very lenient of his abilities, and by whom he was frequently employed, he attended his majesty in many of his journeys and expeditions, and gained not only that prince's esteem, but that of many other great personages, and in particular of lord Falkland, one of the principal secretaries of state.

During the heat of the civil war, he was settled in the earl of St Alban's family; and when the queen-mother was obliged to retire into France, he accompanied her thither, laboured strenuously in the affairs of the royal family, undertook several very dangerous journeys on their account, and was the principal instrument in maintaining an epistolary correspondence between the king and queen.

In the year 1636 it was judged proper that Mr Cowley should come over into England, and, under pretence of privacy and retirement, give notice of the situation of affairs in that kingdom to those by whom he was employed. Soon after his arrival, however, he was seized, in the search after another gentleman of considerable note in the king's party: but although it was through mistake that he was taken, yet when the republicans found all their attempts of every kind to bring him over to their party proved ineffectual, he was committed to a severe confinement, and it was even with considerable difficulty that he obtained his liberty: when, venturing back to France, he remained there, in his former situation, till near the time of the king's return.

Soon after the restoration he became possessed of a very competent estate, through the favour of his principal friends the duke of Buckingham and the earl of St Albans; and being now upwards of 40 years of age, he took up a resolution to pass the remainder of a life which had been a scene of tempest and tumult, in that situation which had ever been the object of his wishes, a studious retirement. His eagerness to get out of the bustle of a court and city made him less careful than he might have been in the choice of a healthful habitation in the country; by which means he found his solitude from the very beginning suit less with the constitution of his body than with his mind. His first rural residence was at *Barn Elms*, a place, which lying low, and being near a large river, was subject to a variety of breezes from land and water, and liable in the winter-time to great inconvenience from the dampness of the soil. The consequence of this Mr Cowley too soon experienced, by being seized with a dangerous and lingering fever. On his recovery from this, he removed to Chertsey, a situation not much more healthy, where he had not been long before he was seized with another consuming disease. Having languished under this for some months, he at length got the better of it, and seemed pretty well recovered from the bad symptoms; when one day in the heat of summer 1667, staying too long in the fields to give some directions to his labourers, he caught a most violent cold, which was attended with a defluxion and stoppage in his breast; and for want of timely care, by treating it as a common cold,

and refusing advice till it was past remedy, he departed this life on the 28th of July in that year, being the 49th of his age; and, on the 3^d of August following, he was interred in Westminster-abbey, near the ashes of Chaucer and his beloved Spencer. He was a man of a very amiable character, as well as an admirable genius. King Charles II. on the news of his death, declared "that Mr Cowley had not left a better man behind him in England." A monument was erected to his memory by George Villiers duke of Buckingham in 1675.

COX (Richard), a learned prelate, and principal pillar of the Reformation, was born at Whaddon in Buckinghamshire, of low parentage, in the year 1499. From Eaton school he obtained a scholarship in King's college in Cambridge, of which he became a fellow in 1519: he was thence invited to Oxford by cardinal Woolsey, and was there made one of the *junior* canons of Cardinal College. In 1525 he was incorporated Bachelor; and the following year took the degree of Master of Arts in the same university. In this situation he became remarkable for his learning and poetical abilities; but his attachment to the opinions of Luther rendered him hateful to his superiors, who stripped him of his preferment, and threw him into prison, on a suspicion of heresy. Being, however, soon released, he was chosen master of Eaton school, which flourished remarkably under his care. In 1537, he commenced Doctor of Divinity at Cambridge; in 1540, was made archdeacon of Ely; and the following year prebendary of that cathedral, on its being new founded by king Henry VIII. In 1546, he was made dean of Christ-church, Oxford. By the recommendation of archbishop Crammer and bishop Goodrich, to the latter of whom he had been chaplain, he not only obtained the above preferments, but was chosen preceptor to prince Edward; on whose accession to the throne he became a favourite at court, was sworn of the privy council, and made king's almoner. In 1547, he was elected chancellor of Oxford; in 1548, canon of Windsor; and the next year, dean of Westminster. About this time he was appointed one of the commissioners to visit the university of Oxford; in which office his zeal for reformation was so excessive, that he destroyed a number of curious and valuable books, for no better reason than because they were written by Roman Catholics. On the accession of queen Mary he was stripped of all his preferments, and committed to the Marshalsea. He was, however, soon released, and immediately left the kingdom. Having resided some time at Strasburg with his intimate friend Pater Martyr, on the death of queen Mary he returned to England, and, with other divines, was appointed to revise the liturgy. He often preached before the queen; and, in 1559, was preferred to the see of Ely, which he continued to enjoy upwards of 21 years. He was, however, no favourite with the queen: the reason assigned for which was, his zealous opposition to her retaining the crucifix and wax-candles on the altar of the royal chapel; also his strenuous defence of the marriage of the clergy, which her majesty always disapproved. He died on the 22^d of July 1581, aged 81. He was a man of considerable learning, a zealous and rigid bulwark of the church

Woxwold
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Crab.

of England, and an implacable enemy both to Papists and Puritans. In a letter to archbishop Parker he advises him to proceed vigorously in reclaiming or *purifying* the Puritans, and not to be discouraged at the frown of those court-favourites who protected them; assuring him that he might expect the blessing of God on his *pious* labours to free the church from their dangerous attempts, and to establish uniformity.—This zealous reformer we find had not totally lost sight of the popish text, *compel them to come in*: but a stronger proof of his implacability and self-importance appears in his letter to the lord treasurer Burleigh, in which he warmly expostulates with the council for interposing in behalf of the Puritans, or meddling in affairs of the church, admonishing them to keep their own sphere. Such language from a bishop would make a modern privy council stare. His works are, 1. Two Latin Orations on the Dispute between Dr Tresham and Peter Martyr, Lond. 1549, 4^{to}. 2. Liturgy of the Church of England; in compiling, and afterwards correcting which, he was principally concerned. 3. The Lord's Prayer in verse, commonly printed at the end of David's Psalms by Sternhold and Hopkins. 4. Translation of the four Gospels, the Acts of the Apostles, and the Epistle to the Romans, in the new translation of the Bible in the reign of queen Elizabeth. 5. Resolutions of some Questions concerning the Sacrament, in the Collection of Records at the end of Burnet's History of the Reformation. 6. Several Letters to the Queen and others, published in Strype's Annals of the Reformation. He is also said to have been concerned in the declaration concerning the divine institution of bishops, and to have assisted Lile in his Grammar.

COXWOLD, a town in the North-riding of Yorkshire, 14 miles north of York. W. Long. 1. 10. N. Lat. 54. 16.

COYPEL (Anthony), an excellent French painter, born at Paris in 1661. Noel Coypel, his father, being chosen by M. Colbert to be director of the academy at Rome, he took his son with him into Italy, where Anthony Coypel formed himself on the works of the greatest masters, and on his return to France was made first painter to the duke of Orleans. That prince employed him in painting the grand gallery of the royal palace, and allowed him a pension. In 1714, he was director of the Academy of Painting and Sculpture. In 1715, he was made first painter to the French king, and was ennobled on account of his merit. He died in 1722. M. Coypel, his son, also excelled in the same art.

COZENING; tricking, or defrauding.—In law, it denotes an offence where any thing is done deceitfully, whether belonging to contracts or not, which cannot be properly termed by any special name.

COZUMEL, an island near the western coast of Yucatan, where Cortez landed and refreshed his troops, before entering upon the conquest of Mexico: W. Long. 89. 0. and N. Lat. 13. 0.

CRAB, in zoology. See CANCEL.

CRAB'S *Claws*, in the materia medica, are the tips of the claws of the common crab broken off at the verge of the black part, so much of the extremity of the claws only being allowed to be used in medicine

as is tinged with this colour. The blackness, however, is only superficial; they are of a greyish white within, and when levigated furnish a tolerable white powder.

CRAB'S claws are of the number of the alkaline absorbents, but they are superior to the generality of them in some degree, as they are found on a chemical analysis to contain a volatile urinous salt.

CRAB'S *Eyes*, in pharmacy, are a strong concretion in the head of the cray-fish. They are rounded on one side, and depressed and finuated on the other, considerably heavy, moderately hard, and without smell. We have them from Holland, Muscovy, Poland, Denmark, Sweden, and many other places.

CRAB'S eyes are much used both in the shop-medicines and extemporaneous prescriptions, being accounted not only absorbent and drying, but also diffusive and diuretic.

CRAB, a sort of wooden pillar, whose lower end, being let down through a ship's decks, rests upon a socket like the capstern; and having in its upper end three or four holes, at different heights, through the middle of it, one above another, into which long bars are thrust, whose length is nearly equal to the breadth of the deck. It is employed to wind in the cable, or to purchase any other weighty matter which requires a great mechanical power. This differs from a capstern, as not being furnished with a *drum-head*, and by having the bars to go entirely through it, reaching from one side of the deck to the other; whereas those of the capstern, which are superior in number, reach only about eight inches or a foot into the drum-head, according to the size thereof. This machine is represented in Plate LXVII. n^o 4. See also CAPSTERN.

CRAB-TAWS, a name in Jamaica for a kind of ulcer on the soles of the feet, with hard callous lips, so hard that it is difficult to cut them. The ungt. cerol. fort. is their cure.

CRACKER, or SEA-PHEASANT, in ornithology, the English name of the *anas acuta*. See ANAS.

CRACKS, in timber. See CLEFT.

CRACKOW, a city of Poland, situated in a palatinate of the same name, and by some accounted the capital of the whole kingdom. It stands at the conflux of the rivers Vistula and Redawa, in E. Long. 20. 16. N. Lat. 50. 8. It is very populous, and the largest and best built town in Poland. The inhabitants had the liberty of purchasing estates, and a voice in choosing the king, while Poland subsisted as an independent state. But the city is now much declined from what it was formerly, and its trade is become inconsiderable; yet it is full of gentry, and a wealthy clergy. The number of the religious houses in the town and suburbs is very great. Here is a castle of such an immense size as to resemble a town in its appearance. It contains the palace, the cathedral, and some other churches and houses; and is defended by walls, towers, and bastions. This was also the place of the king's coronation and burial, and in the cathedral were kept the regalia. The bishop of Cracow is the first in the kingdom, duke of Saveria, and very often a cardinal. His revenues are larger than those of his metropolitan the archbishop of Gelná, and are computed to amount to 40,000 dollars *per annum*. The cathedral is dedicated

Crab
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Crackow.

cated to St Stanislaus, who was formerly bishop of this see; and was murdered by Boleslaus II. at the altar, because he took the liberty to admonish and reprove him; for which reason the king and nobles walked in procession to his shrine the day before the coronation, with a view to expiate the crime, and often made very costly offerings. Masses are said in this church day and night without intermission.

CRADLE, a well known machine in which infants are rocked to sleep.

It denotes also that part of the stock of a cross-bow where the bullet is put.

CRADLE, in surgery, a case in which a broken leg is laid after being set.

CRADLE, among shipwrights, a frame placed under the bottom of a ship, in order to conduct her smoothly and steadily into the water when she is going to be launched; at which time it supports her weight while she slides down the descent or sloping passage called the ways, which are for this purpose daubed with soap and tallow.

CRAFT, a general name for all sorts of vessels employed to load or discharge merchant ships, or to carry alongside or return the stores of men of war. Such are lighters, hoys, barges, prames, &c. See those articles.

CRAKE, or **CORN-CRAKE**. See **RALLUS**.

CRAIL, or **CAREIL**, a parliament town of Scotland, situated on the sea-coast of the county of Fife, about seven miles south-east of St Andrews. W. Long. 2. 20. and N. Lat. 56. 17.

CRAMBE, **SEA-CABBAGE**, **SEA-BEACH KALE**, or **SEA-COLEWORT**; a genus of the siliquosa order, belonging to the tetradynamia class of plants. There are three species, all of them herbaceous esculents with perennial roots, producing annually large leaves resembling those of cabbage spreading on the ground, with strong flower-stalks and yellowish flowers. Only one of the species is a native of Britain: it grows wild on the shores of many of the maritime counties of England, but is cultivated in many gardens as a choice esculent; and the young robust shoots of its leaves and flower-stalks, as they issue forth from the earth after the manner of asparagus shoots, are then in the greatest perfection for use. At this period they appear white as if blanched, and when boiled eat exceeding sweet and tender. Its principal season for use is in April and May. This plant may also be employed in the pleasure-ground as a flowering perennial, for the stalks divide into fine branchy heads of flowers. It is propagated by seeds sown in any common light earth in autumn or spring, where the plants are to remain, which, when two years old, will produce shoots fit for use, will multiply exceedingly by the roots, and continue for many years.

CRAMP, in medicine, a convulsive contraction of any muscular part of the body. It is commonly removed by stretching, and rubbing the part affected.

CRAMP-Fish, or **Torpedo**. See **RAJA**.

CRAMP-Iron, or **Cramps**, a piece of iron bent at

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each end, which serves to fasten together pieces of wood, stones, or other things.

CRAMPONEE, in heraldry, an epithet given to a cross which has at each end a cramp or square piece coming from it; that from the arm in chief towards the sinister angle, that from the arm on that side downwards, that from the arm in base towards the dexter side, and that from the dexter arm upwards.

CRANAGE, the liberty of using a crane at a wharf, and also the money paid for drawing up wares out of a ship, &c. with a crane.

CRANE, in ornithology. See **ARDEA**.

CRANE, in mechanics, a machine used in building commerce for raising large stones and other weights. See **MECHANICS**, n° 65.

CRANE's Bill, in botany. See **GERANIUM**.

CRANE-FLY, in zoology, a species of **TIPULA**.

CRANGANOR, a Dutch factory on the Malabar coast in the East Indies, seated in E. Long. 75. 5. N. Lat. 10. 0. See **COCHIN**.

CRANIOLARIA, in botany, a genus of the angiospermia order, belonging to the didynamia class of plants. There are two species, both natives of hot climates, and neither of them possessed of any remarkable property.

CRANIUM. See **ANATOMY**, n° 10.

CRANMER (Thomas), a celebrated archbishop, reformer, and martyr, was the son of Thomas Cranmer, Esq; of Allacton in Nottinghamshire, where our author was born in 1489. At the age of 14, he was admitted a student of Jesus' college, Cambridge, of which he afterwards became fellow; but, marrying the relation of an inn-keeper's wife, he lost his fellowship, and quitted the college. On the death of his wife, he was re-admitted fellow of Jesus' college. In 1523, he took the degree of doctor of divinity, and was made theological lecturer and examiner. The plague being at Cambridge, he retired to the house of a relation at Waltham abbey, where, meeting with Fox the king's almoner, and Gardiner the secretary, he gave his opinion * concerning king Henry's marriage with Catharine, so much to the satisfaction of his majesty, that he sent for him to court, made him one of his chaplains, and ordered him to write in vindication of the divorce in agitation. This book having quieted the tender conscience of the king, he was desirous that all Europe should be convinced of the illegality of his marriage with queen Catharine; and for that purpose sent Cranmer to France, Italy, and Germany, to dispute the matter with the divines of those countries. At Nuremberg he married a second wife. Being returned to England, in March 1533, he was consecrated archbishop of Canterbury; in May following he pronounced the sentence of divorce between the king and queen, and soon after married the amorous monarch to Ann Boleyn. Being now at the head of the church, he exerted himself in the business of the reformation. The bible was translated into English, and monasteries dissolved principally by his means. In 1536 the royal conscience again required the assistance of our archbishop; in this year

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* This opinion was, that instead of disputing about the validity of the king's marriage with Catharine, they should reduce the matter to this simple question, "Whether a man may marry his brother's wife or no?" When the king was told of it, he said, "This fellow has got the right sow by the ear."

Cranmy
↓
Crassula.

he divorced the king from Ann Boleyn; but, soon after, retuling his content in parliament to the appropriation of the dissolved monasteries to the sole use of the crown, he fell into disgrace, and retired from the business of the state. Nevertheless the king continued to protect him from his enemies; and at his death appointed him one of the executors of his will, and one of the regents of the kingdom. In 1546 he crowned young Edward, during whose short reign he promoted the reformation to the utmost of his power; and was particularly instrumental in compiling, correcting and establishing the liturgy by act of parliament. He had also a share in compiling the thirty-nine articles of religion. On the accession of queen Mary, the poor archbishop was accused of blasphemy, perjury, incontinency, and heresy. He defended himself with some resolution; but being degraded and most ignominiously treated, he was at last flattered and terrified into an insincere recantation, and renunciation of the protestant faith. But this triumph was not sufficient to gratify the pious vengeance of the Romish Mary*. Cranmer was condemned to the flames, and died a Protestant. He suffered at Oxford in the year 1556, in the 67th year of his age. As to his character, he was doubtless a man of learning, an indefatigable and sincere promoter of the reformation; nevertheless he wanted moderation and resolution. He wrote a great number of books: many of them he published himself; and many of them still remain in MSS. viz. two folio volumes in the king's library, several letters in the Cotton collection, &c.

CRANNY, in glass-making, an iron instrument wherewith the necks of glasses are formed.

CRANTOR, a Greek philosopher and poet, was born at Solos in Cilicia. He left his native country where he was admired; went to Athens, and there studied with Polemon under Xenocrates. He was considered as one of the chief supporters of the Platonic sect; and was the first who wrote commentaries upon Plato's works. He flourished 270 years before Christ.

CRAPE, in commerce, a kind of stuff, made in the manner of gauze, with raw silk, gummed and twisted on the mill.

CRAPULA, among physicians. See SURFEIT.

CRASIS, from *κρασις* to "mix;" the temper of the blood peculiar to every constitution.

CRASSAMENTUM, in phycic, the thick red or fibrous part of the blood, otherwise called *crudo*, in contradistinction to the serum or aqueous part.

CRASSULA, LESSER ORPINE, or LIVE-EVER; a genus of the pentagynia order, belonging to the pentandria class of plants. They are 17 species, all of them natives of warm climates. Several of them are cultivated in this country, but require the assistance of artificial heat for their preservation. They rise from

one foot to six or eight in height, and are ornamented with oblong, thick, succulent leaves, and funnel-shaped pentapetalous flowers of a scarlet, white, or greenish colour. They are propagated by off-sets or cuttings; and must be potted in light, sandy compost, retained in a sunny part of the green-house all winter, and very sparingly watered. In summer they may be placed in the full air in a sheltered place, and in dry weather watered twice a-week.

CRASSUS (Marcus), a Roman consul, enriched himself by trading in slaves: he was so wealthy, that he treated all Rome, and gave each citizen a stock of corn for three months. In the year of the city 668, he retired, from the tyranny of Cinna and Marius, to Spain, where Vibicus his friend hid him in a cave for eight months. From thence he went to Africa, where Sylla employed him; and he shewed extraordinary courage against the slaves under Spartacus, whom he defeated, and put those that fled to death. He was afterwards praetor, consul, and triumvir with Cæsar and Pompey. Joining Pompey, he entered Syria, plundered the temple of Jerusalem, and carried immense riches out of Judea. He at length marched against the Parthians; but his army, which was composed of about 100,000 men, was defeated, and himself killed, near Sinnaea, a city of Mesopotamia, in the fifty-third year before the Christian æra. It is said that his head being carried to Orodes king of the Parthians, that prince caused melted gold to be poured into his mouth, saying, that "he should be consumed by the flame metal, the insatiable desire of which had made him commit too many crimes."

CRATÆGUS, WILD-SERVICE TREE, HAWTHORN, &c. a genus of the digynia order, belonging to the icandria class of plants. There are nine species; all of the tree and shrub kind, hardy and deciduous; valuable for economical and ornamental purposes in gardening. They rise from 5 to 50 feet in height, adorned with simple leaves, in some divided, in others entire. Their flowers are of a white colour, pentapetalous, and appear in May and June, succeeded by bunches of red berries in autumn. They are raised abundantly from seeds in the full ground; and to continue the varieties, of which there are a great number distinct, they may be budded or grafted upon stocks of the common hawthorn; for all the sorts will readily take upon that stock or upon one another. The *bawis*, or berries of the hawthorn, never fail to ripen abundantly; and may easily be collected from the hedges and inclosures of fields in September and October; but all the sorts may be had cheap enough from the nursery-men; and the best time to sow them is soon after they are ripe; that is, in October or November, or very early in the spring, in beds of light earth, either broad-cast or in drills, and cover them an inch, or half an inch deep. But, as most of these seeds frequently

Crassus
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Crategus.

* There can be no doubt that her pious majesty was, from the first, determined to bring Cranmer to the stake; and her reason is obvious. If his being a Protestant had been his only crime, his recantation would have been sufficient. But she remembered him as the instrument of her mother's divorce, and this she could never forgive. For this crime even his death was an insufficient atonement. She determined first to make him renounce his religion, by flattering him with the assurance of pardon; by which diabolical policy she intended at once to humble the prelate, and triumph over the protestant cause. As to Cranmer's conduct on this occasion, some think he acted like a wise man. When the question was, *recant or burn*, he prudently chose the former; but when he found that he had been infamous deceived, and that his fate was inevitable, he repented of what he had done, and heroically thrust into the fire the hand which had signed his recantation. If his zeal had not overpowered his prudence, he would have left the kingdom when Mary came to the crown.

Cratches
|
Cratæva.

frequently remain in the ground till the second spring, it is therefore customary with many, previous to sowing, to bury them in a heap in a trench. This is to be done in a dry-lying land, and they will be all the while preparing for vegetation. If buried in October, November, or December, they may be suffered to remain in the ground for a whole year. If they are then sowed as above directed, they will all mostly come up the spring after; though it is observed, that those sowed at once in the beds an inch or two deep, generally come up freely the second spring after sowing, and most commonly shoot stronger and more regular than when the other method is followed.

CRATCHES, in the menage, a swelling on the paster, under the fetlock, and sometimes under the hoof; for which reason it is distinguished into the sinew cratches, which affect the sinew, and those upon the coronet, called *quitter-bones*.

CRATER, in astronomy, the name of a constellation. See **ASTRONOMY**, n° 206.

CRATER is also used to signify the mouth or opening of a volcano or burning mountain, from whence the fire is discharged. See **VOLCANO**.

CRATES, of Thebes, a famous philosopher, was the disciple of Diogenes the Cynic. It is said that he threw all his money into the sea, that he might the more freely apply himself to the study of philosophy. Others assert that he placed it in another person's hands, with orders to give it to his children if they should happen to be fools: For, (said Crates), if they should be philosophers, they will have no need of it: in which case it was to be given to the people. He flourished about 328 years before Christ.

He ought not to be confounded with Crates, a famous academic philosopher, the disciple and friend of Polemon. This last Crates had Arcesilaus and other celebrated philosophers for his disciples; and flourished about 300 years before Christ.

CRATEVA, the **GARLIC PEAR**; a genus of the monogynia order, belonging to the polyandria class of plants. There are two species, both of them natives of several parts of India. They are both of the tree kind; and are chiefly distinguished by their fruit. The tapia, or garlic pear, has a smooth round fruit about the size of an orange, with a hard brown shell or cover, which incloses a mealy pulp, filled with kidney-shaped seeds. It hath a strong smell of garlic, and communicates the same to such animals as feed upon it. The tender buds from the young branches being bruised and applied to the naked skin, will blister as effectually as cantharides. It rises to the height of about 30 feet. The other grows to the size of a very large tree, with trifoliate leaves, sowed on the edges. The flowers have the smell of roses, and are succeeded by an oblong fruit of the size of an apple, covered with a very hard bony shell, and containing a soft fleshy pulp, having the taste of quinces. From the flowers of this plant is obtained by distillation a

water highly odoriferous and cordial. The pulpy part of the fruit is prepared into various kinds of marmalades, which are exceedingly agreeable to the taste, and are much used by the *graudes* in those countries where the trees are native; they are also reckoned serviceable in dysenteries. Both species may be propagated in this country by seeds. These are to be sown upon a hot-bed in the spring; and when the plants come up, they are to be treated in the manner directed for the **ANNONA**.

CRATINUS, an ancient comic poet, of whom we detect scarcely have known any thing, had not Quintilian, Horace, and Perlius, mentioned him, Eupolis, and Aristophanes, as the great masters of what we call the ancient comedy. It is gathered that he died in the 87th Olympiad. Suidas tells us that he wrote 21 plays, and that he was splendid and bright in his characters.

CRATIPPUS, a celebrated peripatetic philosopher, was a native of Mitylene, where he taught philosophy; but at length went to Athens, where Brutus and the son of Cicero, were his disciples. Pompey went to see him after the battle of Pharsalia, and proposed to him his difficulties in relation to the belief of a providence; when Cratippus comforted him, and by forcible arguments answered his objections.

CRATO, a small town of Portugal, in the province of Alentejo, with a rich priory. It is the chief commandery which the knights of Malta have in Portugal. W. Long. 8. 12. N. Lat. 38. 50.

CRAVAN, a town of France, in Burgundy, remarkable for its good wine, and for a battle fought there between the English and French. It is seated near the confluence of the rivers Cure and Yonne. E. Long. 3. 30. N. Lat. 47. 42.

CRAVEN, or **CRAYENT**, a word of reproach, used in trials by battle. See **BATTEL**.

CRAX, in ornithology, a genus of birds, belonging to the order of gallinæ. The base of the beak of each mandible is covered with wax; and the feathers of the head are curled. There are five species, *viz.* 1. The aleator, or Indian hen of Sloane, is about the size of a common hen. It is black, with a white belly. A yellow wax covers about one half of each mandible; the tongue is entire; the temples are bare and black; the tail is roundish, and consists of 14 prime feathers; and it has no spur. It is found in the warm parts of America. 2. The rubra, or Peruvian hen, is red, with a bluish head: it is a native of Peru. 3. The mitu, or Brazilian pheasant, is black, with a dusky belly, and red wax: it is a native of Guinea and Brazil. 4. The globicera, has a yellow protuberance between the nostrils, and is of a bluish-black colour: it is likewise a native of Brazil. 5. The pauxi, or Mexican pheasant of Brissonius, is of a bluish colour, with blue wax, and the tip of the tail and belly white: it is a native of Mexico.

CRAY-FISH, or **CRAW-FISH**. See **CANCER**.

Cratinus
|
Cray.

C R A Y O N - P A I N T I N G .

PASTILS, or **CRAYONS**, are compositions of colours, which are reduced to the texture of chalk,

and used dry in the form and manner of pencils, for painting on paper.

Whether the painter works with oil-colours, water-colours, or crayons, the grand object of his pursuit is still the same: a just imitation of nature. But each species has its peculiar rules and methods.—Painting with crayons requires in many respects a treatment different from painting in oil-colours; because all colours used dry are, in their nature, of a much warmer complexion than when wet with oils, &c. For this reason, in order to produce a rich picture, a much greater portion of what painters term *cooling tints* must be applied in crayon-painting, than would be judicious to use in oils. Without any danger of a mistake, it is to be supposed, the not being acquainted with this observation is one great cause why so many oil-painters have no better success when they attempt crayon-painting. On the contrary, crayon-painters being so much used to those tints, which are of a cold nature when used wet, are apt to introduce them too much when they paint with oils, which is seldom productive of a good effect.

We shall now endeavour to give the student some directions towards the attainment of excellence in this art.

SECT. I. *Of the Application of the Crayons, with some previous Dispositions.*

THE student must provide himself with some strong blue paper, the thicker the better, if the grain is not too coarse and knotty, though it is almost impossible to get any entirely free from knots. The knots should be levelled with a penknife or razor, otherwise they will prove exceedingly troublesome. After this is done, the paper must be pasted very smooth on a linen cloth, previously strained on a deal frame, the size according to the artist's pleasure: on this the picture is to be executed; but it is most eligible not to paste the paper on till the whole subject is first dead-coloured. The method of doing this is very easy, by laying the paper with the dead-colour on its face, upon a smooth board or table, when, by means of a brush, the back-side of the paper must be covered with paste; the frame, with the strained cloth, must then be laid on the pasted side of the paper, after which turn the painted side uppermost, and lay a piece of clean paper upon it, to prevent smearing it; this being done, it may be stroked gently over with the hand; by which means all the air between the cloth and the paper will be forced out.

When the paste is perfectly dry, the student may proceed with the painting. The advantages arising from pasting the paper on the frame according to this method, after the picture is begun, are very great, as the crayons will adhere much better than any other way, which will enable the student to finish the picture with a firmer body of colour, and greater lustre.

When painters want to make a very correct copy of a picture, they generally make use of tiffany or black gauze, strained tight on a frame, which they lay flat on the subject to be imitated, and with a piece of sketching chalk, trace all the out-lines on the tiffany. They then lay the canvas to be painted on, flat upon the floor, placing the tiffany with the chalked lines upon it, and with an handkerchief brush the whole over; this presents the exact out-lines of the picture

on the canvas. The crayon-painter may also make use of this method, when the subject of his imitation is in oils; but in copying a crayon-picture, he must have recourse to the following method, on account of the glass.

The picture being placed upon the easel, let the out-lines be drawn on the glass with a small camel's hair pencil dipped in lake, ground thin with oils, which must be done with great exactness. After this is accomplished, take a sheet of paper of the same size and place it on the glass, stroking over all the lines with the hand, by which means the colour will adhere to the paper, which must be pierced with pin-holes pretty close to each other. The paper intended to be used for the painting must next be laid upon a table, and the pierced paper placed upon it; then with some fine-pounded charcoal, tied up in a piece of lawn, rub over the pierced lines, which will give an exact outline; but great care must be taken not to brush this off till the whole is drawn over with sketching chalk, which is a composition made of whiting and tobacco-pipe clay, rolled like the crayons, and pointed at each end.

When a student paints immediately from the life, it will be most prudent to make a correct drawing of the outlines on another paper, the size of the picture he is going to paint, which he may trace by the preceding method, because erroneous strokes of the sketching chalk (which are not to be avoided without great expertness) will prevent the crayons from adhering to the paper, owing to a certain greasy quality in the composition.

The student will find the sitting posture, with the box of crayons in his lap, the most convenient method for him to paint. The part of the picture he is immediately painting should be rather below his face; for, if it is placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened, at least to the height of six feet from the ground; and the subject to be painted should be situated in such a manner, that the light may fall with every advantage on the face, avoiding too much shadow, which seldom has a good effect in portrait painting, especially if the face he paints from has any degree of delicacy.

Before he begins to paint, let him be attentive to his subject, and appropriate the action or attitude proper to the age of the subject: if a child, let it be childish; if a young lady, express more vivacity than in the majestic beauty of a middle-aged woman, who also should not be expressed with the same gravity as a person far advanced in years. Let the embellishments of the picture, and introduction of birds, animals, &c. be regulated by the rules of propriety and consistency.

The features of the face being correctly drawn with chalks, let the student take a crayon of pure carmine, and carefully draw the nostril and edge of the nose, next the shadow, then, with the faintest carmine tint, lay in the highest light upon the nose and forehead, which must be executed broad. He is then to proceed gradually with the second tint, and the succeeding ones, till he arrives at the shadows, which must be covered brilliant, enriched with much lake, carmine, and

and deep green. This method will at first offensively strike the eye, from its crude appearance; but, in the finishing, it will be a good foundation to produce a pleasing effect, colours being much more easily sullied when too bright, than when the first colouring is dull, to raise the picture into a brilliant state. The several pearly tints discernable in fine complexions must be imitated with blue verditer and white, which answers to the ultramarine tints used in oils. But if the parts of the face where these tints appear are in shadow, the crayons composed of black and white must be substituted in their place.

Though all the face when first coloured should be laid in as brilliant as possible, yet each part should be kept in its proper tone; by which means the rotundity of the face will be preserved.

Let the student be careful when he begins the eyes to draw them with a crayon inclined to the carmine tint, of whatever colour the irises are of; he must lay them in brilliant, and at first not loaded with colour, but executed lightly: no notice is to be taken of the pupil yet. The student must let the light of the eye incline very much to the blue cast, cautiously avoiding a staring white appearance, (which, when once introduced, is seldom overcome), preserving a broad shadow thrown on its upper part, by the eyelash. A black and heavy tint is also to be avoided in the eye-brows; it is therefore best to execute them like a broad glowing shadow at first, on which, in the finishing, the hairs of the brow are to be painted; by which method of proceeding, the former tints will shew themselves through, and produce the most pleasing effect.

The student should begin the lips with pure carmine and lake, and in the shadow use some carmine and black; the strong vermilion tints should be laid on afterwards. He must beware of executing them with stiff, harsh lines, gently intermixing each with the neighbouring colours, making the shadow beneath broad, and enriched with brilliant crayons. He must form the corner of the mouth with carmine, brown, and greens, variously intermixed. If the hair is dark, he should preserve much of the lake and deep carmine tints therein; this may easily be overpowered by the warmer hair tints, which, as observed in painting the eye-brows, will produce a richer effect when the picture is finished; on the contrary, if this method is unknown or neglected, a poverty of colouring will be discernable.

After the student has covered over, or as artists term it, has dead-coloured the head, he is to sweeten the whole together, by rubbing it over with his finger, beginning at the strongest light upon the forehead, passing his finger very lightly, and uniting it with the next tint, which he must continue till the whole is sweetened together, often wiping his finger on a towel to prevent the colours being sullied. He must be cautious not to smooth or sweeten his picture too often, because it will give rise to a thin and scanty effect, and have more the appearance of a drawing than a solid painting; as nothing but a body of rich colours can constitute a rich effect. To avoid this, (as the student finds it necessary to sweeten with the fin-

ger), he must continually replenish the picture with more crayon.

When the head is brought to some degree of forwardness, let the back-ground be laid in, which must be treated in a different manner, covering it as thin as possible, and rubbing it into paper with a leather-stump. Near the face the paper should be almost free from colour, for this will do great service to the head, and by its thinness, give both a soft and solid appearance. In the back-ground also, no crayon that has shining in its composition should be used, but chiefly such as are the most brilliant, and the least adulterated. The ground being painted thin next the hair, will give the student an opportunity of painting the edges of the hair over in a light and free manner when he gives the finishing touches.

The student having proceeded thus far, the face, hair, and back-ground being entirely covered, he must carefully view the whole at some distance, remarking in what respect it is out of keeping, that is, what parts are too light, and what too dark, being particularly attentive to the white, or chalky appearances, which must be subdued with lake and carmine. The above method being properly put into execution, will produce the appearance of a painting principally composed of three colours, viz. carmine, black, and white, which is the best preparation a painter can make for the producing a fine crayon-picture.

The next step, is to complete the back-ground and the hair, as the dust, in painting these, will fall on the face, and would much injure it if that was completed first. From thence proceed to the forehead, finishing downward till the whole picture is completed.

In painting over the forehead the last time, begin the highest light with the most faint vermilion tints, in the same place where the faint carmine was first laid, keeping it broad in the same manner. In the next shade succeeding the lightest, the student must work in some light blue tints, composed of verditer and white, intermixing with them some of the deeper vermilion tints, sweetening them together with great caution*, insensibly melting them into one another, increasing the proportion of each colour as his judgment shall direct. Some brilliant yellows may also be used, but sparingly; and towards the roots of the hair, strong verditer tints, intermixed with greens, will be of singular service. Cooling crayons, composed of black and white, should succeed these, and melt into the hair. Beneath the eyes, the sweet, pearly tints are to be preserved, composed of verditer and white, and under the nose, and on the temples, the same may be used; beneath the lips, tints of this kind also are proper, mixing them with the light greens and some vermilion.

In finishing the cheeks, let the pure lake clear them from any dust contracted from the other crayons; then, with the lake may be intermixed the bright vermilion; and last of all, (if the subject should require it), a few touches of the orange-coloured crayon, but with extreme caution; after this, sweeten that part with the finger as little as possible, for fear of producing a heavy, disagreeable effect on the cheeks: as the beauty of a crayon-picture consists in

one.

* This direction is for the finest complexions, but the student must vary his colouring according to his subject.

one colour shewing itself through, or rather between another; this the student cannot too often remark, it being the only method of imitating beautiful complexions.

The eye is the most difficult feature to execute in crayons, as every part must be expressed with the utmost nicety, to appear finished; at the same time that the painter must preserve its breadth and solidity while he is particularizing the parts. To accomplish this, it will be a good general rule for the student to use his crayon in sweetening as much, and his finger as little as possible. When he wants a point to touch a small part with, he may break off a little of his crayon against the box, which will produce a corner fit to work with in the minutest parts. If the eye-lashes are dark, he must use some of the carmine and brown oker, and the crayon of carmine and black; and with these he may also touch their iris of the eye (if brown or hazel), making a broad shadow, caused by the eye-lash. Red tints of vermilion, carmine, and lake, will execute the corners of the eye properly; but if the eye-lids are too red, they will have a disagreeable, sore appearance. The pupil of the eye must be made of pure lamp-black; between this and the lower part of the iris, the light will catch very strong, but it must not be made too sudden, but be gently diffused round the pupil till it is lost in shade. When the eye-balls are sufficiently prepared, the shining speck must be made with a pure white crayon, which should be first broken to a point, and then laid on firm; but as it is possible they may be defective in neatness, they should be corrected with a pin, taking off the redundant parts, by which means they may be formed as neat as can be required.

The difficulty, with respect to the nose, is to preserve the lines properly determined, and at the same time so artfully blended into the cheek, as to express its projection, and yet no real line to be perceptible upon a close examination; in some circumstances it should be quite blended with the cheek, which appears behind it, and determined entirely with a slight touch of red chalk. The shadow caused by the nose is generally the darkest in the whole face, partaking of no reflection from its surrounding parts. Carmine and brown oker, carmine and black, and such brilliant crayons will compose it best.

The student having before prepared the lips with the strongest lake and carmine, &c. must, with these colours, make them completely correct; and, when finishing, introduce the strong vermillions, but with great caution, as they are extremely predominant. This, if properly touched, will give the lips an appearance equal, if not superior, to those executed in oils, notwithstanding the seeming superiority the latter has, by means of glazing*, of which the former is entirely destitute.

When the student paints the neck, he should avoid expressing the muscles too strong in the stem, nor should the bones appear too evident on the chest, as both have an unpleasant effect, denoting a violent agitation of the body, a circumstance seldom necessary to express in portrait-painting. The most necessary part to be expressed, and which should ever be observed,

(even in the most delicate subjects), is a strong marking just above the place where the collar bones unite; and if the head is much thrown over the shoulders, some notice should be taken of the large muscle that rises from behind the ear, and is inserted into the pit between the collar bones. All inferior muscles should be, in general, quite avoided. The student will find this caution necessary, as most subjects, especially thin persons, have the muscles of the neck much more evident than would be judicious to imitate. As few necks are too long, it may be necessary to give some addition to the stem, a fault on the other side being quite unpardonable, nothing being more ungraceful than a short neck. In colouring the neck, let the student preserve the stem of a pearly hue, and the light not so strong as on the chest. If any part of the breast appears, its transparency must also be expressed by pearly tints; but the upper part of the chest should be coloured with beautiful vermillions delicately blended with the other.

SECT. II. *Of the Drapery.*

DARK blue, purple, black, pink, and all kinds of red draperies also, should be first tinged with carmine, which will render the colours much more brilliant than any other method; over this should be laid on the paper, the middle tint, (a medium between the light and dark tints, of which the drapery is to be painted), except the dark masses of shadow, which should be laid on at first as deep as possible; these, sweetened with the finger, being destitute of the smaller folds, will exhibit a masterly breadth, which the lesser folds, when added, ought by no means to destroy. With the light and dark tints, the smaller parts are next to be made with freedom, executing, as much with the crayon, and as little with the finger as possible, in each fold touching the last stroke with the crayon, which stroke the finger must never touch. In the case of reflections, the simple touch of the crayon will be too harsh, therefore, fingering will be necessary afterwards, as reflected lights are always more gentle than those which are direct. With respect to reflections in general, they must always partake of the same colour as the object reflecting, but in the case of single figures, it may be useful to make some particular observations.

In a blue drapery, let the reflections be of a greenish cast; in green draperies, make them of a yellow tint; in yellow, of an orange; in orange, reflect a reddish cast; in all reds, something of their own nature, but inclined to the yellow: black should have a reddish reflection; the reflection of a reddish tint will also reflect purples to the best advantage.

Of whatever colour the drapery is, the reflection on the face must partake thereof, otherwise the picture, like paintings on glass, will have but a gaudy effect.

Linen, lace, fur, &c. should be touched spiritedly with the crayon, fingering very little, except the latter; and the last touches, even of this, like all other parts, should be executed by the crayon, without sweetening with the finger.

The methods above recommended, have been practiced by the most celebrated crayon-painters, whose

* The method with which painters in oils express transparency in the lips is, by painting them first with light vermilion tints, and, when dry, touching them over with pure lake.

works have been held in public estimation; but the knowledge of, and ability to execute each separate part with brilliancy and truth, will be found very insufficient to constitute a complete painter, without his judgment enables him to unite them with each other, by correctness of drawing, propriety of light and shadow, and harmony of colouring. In order to accomplish this, the student should carefully avoid finishing one part in particular, till he has properly considered the connection it is to have with the rest. The neglect of this is the principal reason why the performances of indifferent painters are so destitute of what is termed breadth, so conspicuously beautiful in the works of great masters. It must be granted, that this observation relates more particularly to large compositions, where a diversity of figures requires such a judicious disposition, that each may assist in the combination of a kind of universal harmony; yet, even in portrait-painting, the student should be particularly attentive to observe this idea of breadth, if he is desirous of acquiring that importance and dignity which constitutes excellence in painting.

SECT. III. *Of the Materials.*

THE perfection of the crayons consists, in a great measure, in their softness; for it is impossible to execute a brilliant picture with them if they are otherwise, on which account great care should be observed in the preparing them, to prevent their being hard. In all compositions, flake-white, and white-lead should be wholly rejected, because the slightest touch with either of these will unavoidably turn black.

The usual objection to crayon-paintings is, that they are subject to change; but whenever this happens, it is entirely owing to an injudicious use of the above-mentioned whites, which will stand only in oils. To obviate the bad effects arising from the use of such crayons, let the student make use of common whiting prepared in the following manner.

Take a large vessel of water, put the whiting into it, and mix them well together; let this stand about half a minute, then pour off the top into another vessel, and throw the gritty sediment away; let what is prepared rest about a minute, and then pour it off as before, which will purify the whiting and render it free from all dirt and grittiness. When this is done, let the whiting settle, and then pour the water from it; after which, lay it on the chalk to dry, and keep it for use, either for white crayons, or the purpose of preparing tints with other colours, for with this, all other tints may be safely prepared. If the student chuses to make crayons of the whiting immediately after it is washed, it is not necessary to dry it on the chalk, for it may be mixed instantly with any other colour, which will save considerable trouble. All colours of a heavy, or gritty nature, especially blue verditer, must be purified by washing after this method.

The student must be provided with a large, flexible pullet-knife, a large stone and muller to levigate the colours, two or three large pieces of chalk to absorb the moisture from the colours after they are levigated, a piece of flat glass to prevent the moisture from being absorbed too much, till the colours are rolled into

form, and vessels for water, spirits, &c. as necessity and convenience shall direct.

I. REDS.

It is rather difficult to procure either good carmine or good lake. Good carmine is inclined to the vermilion tint, and good lake to the carmine tint. The carmine crayons are prepared in the following manner.

1. **CARMINE.** As their texture is inclinable to hardness, instead of grinding and rolling them, take a sufficient quantity of carmine, lay it upon the grinding-stone, mix it with a levigating knife with spirits of wine, till it becomes smooth and even. The chalk-stone being ready, lay the colour upon it to absorb the spirit; but be careful that it is laid on in a proper shape for painting. If it is levigated too thin, the crayons will be too flat, and if too thick, it will occasion a waste of colour, by their adhering to the pallet-knife; but practise will render the proper degree of consistency familiar.

The simple colour being prepared, the next step is to compose the different tints by a mixture with whiting; the proportion to be observed consisting of 20 gradations to one, which may be clearly understood by the following directions. Take some of the simple colour, and levigate it with spirits of wine, adding about one part of washed whiting to three parts of carmine, of which, when properly incorporated, make two parcels. The next gradation should be composed of equal quantities of carmine and whiting, of which four crayons may be made. The third composition should have one fourth carmine, and three fourths whiting, of this make six crayons, which will be a good proportion with the rest. The last tint should be made of whiting, very faintly tinged with carmine; of which make about eight crayons, which will complete the above-mentioned proportion. As these compound tints are levigated, they are to be laid immediately upon the chalk that the moisture may be absorbed to the proper degree of dryness for forming into crayons, which may be known by its losing the greater part of its adhesive quality when taken into the hand: if the consistency is found to be right, it may be then laid upon the glass, which having no pores will prevent the moisture from becoming too dry before it is convenient to form it into crayons, otherwise the crayons would be full of cracks and very brittle, which will be a great inconvenience when they are used in painting.

2. **LAKE** is a colour very apt to be hard, to prevent which the student must observe the following particulars:

Take about half the quantity of lake intended for the crayons, and grind it very fine with spirits of wine; let it dry, and then pulverize it, which is easily done if the lake is good; then take the other half, and grind it with spirits, after which mix it with the pulverized lake, and lay it out directly in crayons on the chalk. This colour will not bear rolling. The simple colour being thus prepared, proceed with the compound crayons, as directed before, and in the same degrees of gradation as the carmine tints.

3. **VERMILION**; the best is inclined to the carmine tint.

teint. Nothing is required to prepare this colour more than to mix it on the stone with soft water or spirits, after which it may be rolled into crayons. The different tints are produced by a mixture of the simple colour with whiting, according to the proportions already given.

II. B L U E S .

1. **PRUSSIAN-BLUE** is a colour very apt to bind, and is rendered soft with more difficulty than carmine and lake. The same method of preparation is to be followed with this as directed with respect to lake, only it is necessary to grind a larger quantity of the pure colour, as it is chiefly used for painting draperies. The different tints may be made according to necessity, or the fancy of the painter.

2. **BLUE-VERDITER** is a colour naturally gritty, and therefore it is necessary to wash it well. Its particles are so coarse as to require some binding matter to unite them, otherwise the crayons will never adhere together. To accomplish this, take a quantity sufficient to form two or three crayons, to which add a piece of flaked plaster of Paris about the size of a pea; mix these well together, and form the crayons upon the chalk. This blue is extremely brilliant, and will be of great use in heightening draperies, &c. The tints must be formed with whiting as directed in the former instances, and are highly serviceable for painting flesh, to produce those pearly tints so beautiful in crayon-pictures. It is not necessary to mix the compounds with spirits, as clear water will be sufficient.

III. G R E E N S .

BRILLIANT-GREENS are produced with great difficulty. In Switzerland, they have a method of making them, far superior to ours*. We usually take yellow oker, and after grinding it with spirits, mix it with the powder of Prussian blue, then temper it with a knife, and lay the crayons on the chalk, without rolling them. Instead of this, some use king's yellow mixed with Prussian blue, and others, brown oker and Prussian blue. The crayons made of the two last may be rolled. Various tints may be produced by these colours, according to fancy or necessity; some to partake more of the blue, and others of the yellow.

IV. Y E L L O W S .

1. **KING'S-YELLOW** is the most useful and the most brilliant, levigated with spirits of wine, and compose the different tints as before directed. Yellow oker and Naples yellow ground with spirits will make useful crayons.

2. **ORANGE** is produced with king's-yellow and vermilion ground together with spirits, and the tints formed as in other cases, but no great quantity of them is required.

V. B R O W N S .

1. **CULLENS-EARTH** is a fine dark brown. After six or eight of the simple crayons are prepared, several rich compound tints may be produced from it, by a mixture with carmine, in various degrees. Black,

carmine, and this colour, mixed together, make useful tints for painting hair; several gradations may be produced from each of these by a mixture with whiting. Roman, or brown oker is an excellent colour, either simple or compounded with carmine. Whiting tinged in several degrees with either of these, will prove very serviceable in painting.

2. **UMBER** may be treated in just the same manner, only it is necessary to levigate it with spirits of wine.

VI. P U R P L E S .

PRUSSIAN-BLUE ground with spirits, and mixed with pulverized lake, will produce a good purple. Carmine thus mixed with Prussian blue, will produce a purple something different from the former. Various tints may be made from either of these compounds by a mixture with whiting.

VII. B L A C K .

1. **LAMP-BLACK** is the only black that can be used with safety, as all others are subject to mildew; but as good lamp-black is very scarce, the student will, perhaps, find it most expedient to make it himself; the process of which is as follows:

Provide a tine cone, fix it over a lamp at such a height that the flame may just reach the cone for the foot to gather within it. When a sufficient quantity is collected, take it out, and burn all the grease from it in a crucible. It must then be ground with spirits and laid on the chalk to absorb the moisture. Various grey tints may be formed from this by a mixture with whiting, as mentioned in former instances.

2. **VERMILION** mixed with carmine.—This is a composition of great use, and tints made from this with whiting will be found to be very serviceable.

3. **CARMINE** and black is another good compound, of which five or six gradations should be made, some partaking more of the black, and others having the carmine most predominant, besides several tints by a mixture with whiting.

4. **VERMILION** and black is also a very useful compound, from which several different tints should be made.

5. **PRUSSIAN-BLUE** and black is another good compound, and will be found of singular service in painting draperies.

It is impossible to lay down rules for the forming every tint necessary in composing a set of crayons, there being many accidental compositions, entirely dependant on fancy and opinion. The student should make it a rule to save the leavings of his colours; for of these he may form various tints, which will occasionally be useful.

SECT. IV. *Of Rolling the Crayons, and disposing them for Painting.*

THE different compositions of colours must be cut into a proper magnitude, after they are prepared, in order to be rolled into pastils, for the convenience of using them. Each crayon should be formed in the left hand with the ball of the right, first formed cylindrically,

* Mr Bonhote, in Haylé's court, Soho, is the original importer of these crayons from Lausanne, in Switzerland; the student may find it very useful to supply deficiencies of this nature with them, as the ingredients which compose these brilliant crayons are not to be met with in England.

cally, and then tapered at each end. If the composition is too dry, dip the finger in water; if too wet, the composition must be laid upon the chalk again to absorb more of the moisture. The crayons should be rolled as quick as possible; and when finished, must be laid upon the chalk again, to absorb all remaining moisture. After the gradation of tints from one colour are formed, the stone should be well scraped and cleaned with water before it is used for another colour.

When the set of crayons is completed according to the rules prescribed, they should be arranged in classes for the convenience of painting with them. Some thin drawers, divided into a number of partitions is the most convenient method of disposing them properly. The crayons should be deposited according to the several gradations of light. The bottom of the partitions must be covered with bran, as a bed for the colours; because it not only preserves them clean, but prevents their breaking.

C R E

C R E

CREAM, a general name applicable to all substances that separate from a liquor, and are collected upon its surface; but is more particularly applied to the following.

CREAM of *Lime*, is that part of the lime which has been dissolved in the water in its caustic state, but having again attracted some fixed air from the atmosphere, becomes incapable of solution, and therefore separates from the water in the mild state of chalk, or limestone.

CREAM of *Milk*, generally called simply *cream*, is the most oily part of the milk; which being naturally only mixed, and not dissolved in the rest, soon separates from them, as being specifically lighter; after which it collects on the surface; from which it is generally skimmed, to complete the disengagement of the oily from the aqueous and ferous parts, that is to make butter *. Cream of milk is not only an agreeable aliment when recent, but is also useful in medicine as a lenient, when applied to tetter and erysipelas attended with pain and proceeding from an acrid humour.

CREAM of *Tartar*. See CHEMISTRY, n° 292.

CREAT, in the menage, an usher to a riding master; or a gentleman bred in the academy, with intent to make himself capable of teaching the art of riding the great horse.

CREATION, is commonly applied to the original formation of the materials whereof the visible system of nature is formed. It is reckoned to be an absolute and incommunicable prerogative of divine power, as by creation all things were produced out of nothing; the subsequent creations being only transformations or changes of shape in what was already made.

There is no subject concerning which there have been more disputes than this of creation. It is certain that none of the ancient philosophers had the smallest idea of its being possible to produce a substance out of nothing, or that even the power of the deity himself could work without any materials to work upon. Hence some of them, among whom was Aristotle, asserted that the world was eternal, both as to its matter and form. Others, though they believed that the

The box made use of when the student paints, should be about a foot square, with nine partitions. In the upper corner, on the left hand, (supposing the box to be in the lap when he paints), let him place the black and grey crayons, those being the most seldom used; in the second partition, the blues; in the third, the greens and browns; in the first partition on the left hand of the second row, the carmines, lakes, vermilion, and all deep reds; the yellows and orange in the middle, and the pearly tints next; and as these last are of a very delicate nature, they must be kept very clean, that the gradations of colour may be easily distinguished: In the lowest row, let the first partition contain a piece of fine linen rag to wipe the crayons with while they are using; the second, all the pure lake and vermilion tints; and the other partition may contain those tints, which, from their complex nature, cannot be classed with any of the former.

gods had given the world its form, yet imagined the materials whereof it is composed to have been eternal. Indeed, the opinions of the ancients, who had not the benefit of revelation, were on this head so confused and contradictory, that nothing of any consequence can be deduced from them. The free-thinkers of our own and of former ages have denied the possibility of creation, as being a contradiction to reason, and of consequence have taken the opportunity from thence to discredit revelation. On the other hand, many defenders of the sacred writings have asserted, that creation out of nothing is so far from being a contradiction to reason, that it is not only probable but demonstrably certain. Nay, some have gone so far as to say, that from the very inspection of the visible system of nature, we are infallibly certain that it was once in a state of non-existence. It would be impossible for us, however, to enter into the multiplicity of arguments used on both sides; nor can we pretend to settle it, as the subject is confessedly above human comprehension. We shall therefore content ourselves with giving a short abstract of the opinions of those that seem to keep the most proper medium between the extremes above mentioned.

“ It is confessed (say they) that creation is utterly beyond the comprehension of man. We readily allow that the power which gives existence to that which had none before is imperceptible to human wisdom; but though it is so to us, that is no reason why it should be so to the Deity. It is impossible that a negative argument of this kind can be taken for a demonstration, unless we lay it down as a first principle, that man is the wisest of all possible beings. Though it is granted, therefore, that our reason cannot discover the world to be created, this only proves that we cannot create, but it cannot in the least affect the truth of the sacred writings. Nay, so far from this being any objection to the truth of the doctrine, it is a proof nothing short of demonstration in its favour. When it is agreed on all hands that creation out of nothing is an effect of power whereof man can form no idea either by his senses or reason, it thence follows, that it is absolute-

Credentials ly beyond the power of his imagination also to invent or relate any thing concerning it. The reason of this is, that the imagination of man, as well as his reason, is limited by his senses; and therefore, we can neither reason nor imagine but where sense lays a foundation. But as creation is utterly beyond our senses, it is therefore beyond our imagination also, and consequently cannot be a lie of human invention. Hence we see, that in fact it never was discovered by the most learned and sharp-sighted philosophers. The thought is peculiar to that book which we commonly reckon to be of divine original; nor is it to be found in human writings of any age or country, excepting where it is manifestly taken from the scriptures."

CREDENTIALS, letters of recommendation and power, especially such as are given to ambassadors or public ministers, by the prince or state that sends them to foreign courts.

CREDIBILITY, a species of evidence, less indeed than absolute certainty or demonstration, but greater than mere possibility: it is nearly allied to probability, and seems to be a mean between possibility and demonstration.

CREDIT, in commerce, a mutual trust or loan of merchandize or money, on the reputation of the property and sufficiency of a dealer. See **COMMERCE**.

CREDITON, a market-town in Devonshire, considerable for a good woollen manufactory: it is situated about 9 miles north-west of Exeter, in W. Long. 3. 50. and N. Lat. 50. 50.

CREDITOR, a person to whom any sum of money is due, either by obligation, promise, or otherwise. See **DEBT**.

CREECH (Thomas), an eminent poet in the 17th century, of Dorsetshire, born 1650. He soon began to distinguish himself in the republic of letters by the works which he published; but they were of no advantage to his fortune, since his circumstances were always very indifferent. He died in a very unfortunate manner. In 1700 he fell in love with a woman who treated him with great neglect, though she was complaisant enough to others. He could not digest this affront; but shut himself up in his study, where he hanged himself. Others say, that being naturally morose, his resentments frequently engaged him in disputes which in the end proved fatal to him. Mr Dryden styles him a learned and judicious writer. His translation of *Lucretius* is esteemed. But he wrote beside this a translation of *Horace*, and many other pieces.

CREED, a brief summary of the articles of a Christian's belief.

The most ancient form of creeds is that which goes under the name of the apostolic creed; besides this, there are several other ancient forms and scattered remains of creeds to be met with in the primitive records of the church. The first is the form of apostolical doctrine, collected by Origen; the second is a fragment of a creed preserved by Tertullian; the third remains of a creed is in the works of Cyprian; the fourth, a creed composed by Gregory Thaumaturgus, for the use of his own church; the fifth, the creed of Lucian the martyr; the sixth, the creed of the apostolical constitutions. Besides these scattered remains

of the ancient creeds, there are extant some perfect forms, as those of Jerusalem, Cæsaræa, Antioch, &c.

The most universal creeds are, the **APOSTOLICAL**, the **ATHANASIAN**, and the **NICENE** creeds.

CREEK, the part of a haven where any thing is landed from the sea.

CREEPER, in ornithology. See **CERTHIA**.

CREEPER, in naval affairs, an instrument of iron resembling a grappling, having a *shank*, and four hooks or claws. It is used to throw into the bottom of any river or harbour, with a rope fastened to it to hook and draw up any thing from the bottom which may have been lost. See Plate LXXXI. fig. 11.

CRELIUS (John), a famous Socinian, born in 1590, in a village near Nuremberg. In 1612 he went into Poland, where the Unitarians had a school, in which he became professor of divinity, and minister at Crackow, where he died in 1632, aged 42. He was the author, 1. Of a famous Treatise against the Mystery of the Trinity; 2. Commentaries on a part of the New Testament; and other works. All of them are scarce.

CREMA, a city and bishop's see of Italy, capital of a district of the Milanese, called from it *Crema*; it stands almost in the middle between Milan and Mantua, in E. Long. 10. 15. and N. Lat. 45. 20.

CREMASTER, in anatomy, the name of a muscle of the testicle, of which there is one on each side. See **ANATOMY**, *Table of the Muscles*.

CREMONA, a city of Italy, and capital of a district of the Milanese, called from it the *Cremonese*; is situated 45 miles south-east of Milan, in E. Long. 10. 30. and N. Lat. 45. 0.

CRENATED, in botany. See there, p. 1296, n° 74.

CRENELLE, or **IMBATTLED**, in heraldry, is used when any honourable ordinary is drawn, like the battlements on a wall to defend men from the enemies' shot. This attribute belongs to the arms of such as have defended castles for their prince or country, or of such as are skilled in architecture.

CRENOPHYLAX, in antiquity, a magistrate of Athens, who had the inspection of fountains.

CREON, the first annual archon of Athens. See **ATTICA**, n° 28.

CREPANCE, in the menage, a chop or cratch in a horse's leg, given by the sponges of the shoes of one of the hinder feet crossing and striking against the other hinder foot. This cratch degenerates into an ulcer.

CREPIS, **HAWK-WEED**; a genus of the polygamia æqualis order, belonging to the lyngenea class of plants. There are 14 species, most of them herbaceous annuals, rising to the height of a foot, or a foot and an half; and having their branches terminated by ligulated compound red and yellow flowers. These are very large, and consist of many flat florets spread over one another imbricatum, and when fully blown appear as if radiated. They are very conspicuous and beautiful; and appear in June, July, and August. They are succeeded by plenty of seed, which, if permitted to scatter on the ground, will produce a number of young plants without further trouble.

CREPUNDIA, in antiquity, a term used to express such

Creek
|
Crependia.

◀ Crescent
|
◀ Crescent.

such things as were exposed along with children, as rings, jewels, &c. serving as tokens whereby they afterwards might be known.

CRESCENT, the new moon, which, as it begins to recede from the sun, shews a little rim of light, terminating in points, called *horns*, that are still increasing, till it is in opposition to the sun, at which time it is full moon, or quite round.

CRESCENT, in heraldry, a bearing in form of a new moon.

It is used either as an honourable bearing; or as the difference to distinguish between elder and younger families, this being generally assigned to the second son and those that descend from him. The figure of the crescent is the Turkish symbol, with its points looking towards the top of the chief, which is its most ordinary representation, called *crescent montant*. Crescents are said to be adossed, when their backs are turned towards each other; a crescent is said to be inverted, when its points look towards the bottom; turned crescents have their points looking to the dexter side of the shield; cornuted crescents, to the sinister side; and affronted crescents, contrary to the adossed, have their points turned to each other.

CRESCENT, a term among farriers. Thus a horse is said to have crescents when that part of the coffinbone, which is most advanced, falls down and presses the sole outwards, and the middle of the hoof above shrinks, and becomes flat, by reason of the hollowness beneath it.

CRESCENTIA, the **CALABASH-TREE**; a genus of the angiospermia order, belonging to the didynamia class of plants. There are two species.

1. The *Cujete*, with oblong narrow leaves and a large oval fruit, is a native of Jamaica and the Leeward Islands. It hath a thick trunk covered with a whitish bark, which rises from 20 to 30 feet high, and at the top divides into many branches, forming a large and regular head, garnished with leaves, which come out irregularly, sometimes single; at other times many arise out of the same knot: the flowers are produced from the sides of the large branches, and sometimes from the trunk, standing upon long foot-stalks. They have but one petal, which is irregular; and they are of a greenish yellow colour, striped and spotted with brown. These are succeeded by very large fruit, generally spherical, sometimes oval; and at other times they have a contracted neck like a bottle; and are so large, that when the pulp and seeds are cleaned out, the shells will contain three pints or two quarts of liquid. The fruit is covered externally with a thin skin of a greenish-yellow colour when ripe. When this is peeled off, there appears a hard ligneous shell, inclosing a pale yellowish soft pulp of a tart unsavoury flavour, surrounding a great number of flat heart-shaped seeds.

2. The *latifolia*, or broad-leaved calabash, seldom rises more than 15 or 20 feet high, with an upright trunk, covered with a white smooth bark, sending out many lateral branches at the top, garnished with leaves three inches in length, and one and a quarter broad, ranged alternately. The flowers come out as in the former species; but are smaller, and of a deeper yellow colour. The fruit of this sort is sometimes round, sometimes oval, but of very unequal

sizes. Both these species are easily propagated by seeds; but the plants are too tender to live in this country, unless they are constantly kept in a stove.

The shells of calabashes are made use of for various purposes. At Barbadoes, besides drinking-cups and punch-bowls, there are made of them spoons, dishes, and other utensils for the slaves. Some of these shells are so large, as to be capable of holding 15 pints of water. The pulp is seldom eaten, except by cattle in the time of drought. The wood, which is hard and smooth, is made into stools, chairs, and other furniture.

CRESS, **WATER-CRESS**, or **CRESSES**, in botany. See **SISYMBRIUM**.

Indian Cress. See **TROPEOLUM**.

CRESSY, a port-town of Picardy in France, about 44 miles south of Calais, and 27 north-west of Abbeville, remarkable on account of the victory obtained there over the French, by Edward III. of England, in the year 1346. E. Long. 2.0. N. Lat. 50. 20.

CREST, in armoury, the top-part of the armour, for the head, mounting over the helmet, in manner of a comb, or tuft of a cock; deriving its name from *crissa*, a cock's comb.

The crest was for the most part made of feathers, or the hair of horses tails or mains. The soldiers took great pride in adorning them.

CREST, in heraldry, the figure placed above the helmet in an achievement. See **HERALDRY**, n° 49.

CREST-fallen, a fault of an horse, when the upper part of his neck, called the *crest*, hangs to one side: this they cure by placing it upright, clipping away the spare skin, and applying plasters to keep it in a proper position.

CRETA, or **CHALK**, in natural-history. See **CHALK**.

CRETE, one of the largest islands in the Mediterranean, lying between 22 and 27 degrees of east longitude, and between 35 and 36 degrees of north latitude. According to Strabo, this island is 287 miles in length; according to Pliny, 270; and, according to Scylax, 312. As to its breadth, it is not, as Pliny observes, above 55 miles where widest; whence it was styled, as Stephanus observes, the *Long Island*. It has the Archipelago to the north, the African sea to the south, the Carpathian sea to the east, and the Ionian to the west. Anciently it was known by the names of *Aria*, *Chthonia*, *Idea*, *Curete*, *Macaria*, &c.; but its most common name was that of *Crete*. This last name is by some derived from the *Curetes*, whom they reckon to have been the first inhabitants of the island; by others from the nymph *Crete*, daughter of Hesperus, or from Cretus the son of Jupiter, who reigned here.

The first inhabitants of Crete, according to Diodorus Siculus, were the *Idæi Daetyli*, who inhabited mount Ida. See **DACTYLI**.

Next to the *Idæi Daetyli* were the nine *Curetes*; some of whom are supposed to have sprung from the earth, and others to be descended from the *Idæi Daetyli*. See **CURETES**.

The *Titans* were cotemporary with the *Curetes*; and dwelt in the country where the city of *Gnosus* was afterwards built. They were in number six men, and five women. Some say they were the offspring

◀ Crest
|
◀ Crest.

of Uranus and Terra; others that they were descended from one of the Curetes and *Titea*; whence their name of *Titans*. The men were *Cronus*, or *Saturn*, *Hyperion*, *Cæus*, *Japetus*, *Crius*, and *Occanus*; the women were *Rhæa*, *Themis*, *Mnemosyne*, *Phœbe*, and *Thetis*. All these were also deified, on account of their useful inventions. Saturn, the eldest, obtained the kingdom of Crete, and brought his subjects to a somewhat more civilized kind of life than they formerly used, which gave occasion to the many fables of the poets concerning the Golden Age. Hyperion was the first who observed the motions of the sun, moon, and stars, measuring by them the seasons of the year; and hence he was called the father of the planets. Latona was the daughter of Cæus and Phœbe, and Prometheus, so famous among the poets, the son of Japetus. He is said to have found out the way of striking fire with flint, which gave occasion to the fable of his stealing fire from heaven. Mnemosyne invented many things conducing to help a man's memory, whence her name. Themis taught the art of divination; instructed men in holy rites; and prescribed laws for the worship of the gods, and for the preservation of peace and good government among men. Vesta, Ceres, Juno, Jupiter, Neptune and Pluto, are supposed to have been the children of Saturn and Rhæa. Vesta invented the art of building houses; Ceres the use of corn; Neptune the art of navigation; and Pluto, funeral solemnities. Hence the latter was styled "Prince of the infernal shades;" and the former, "Prince of the sea."

Though the island of Crete is one of the most remarkable in the writings of the ancient historians and poets, its history affords nothing interesting. The only remarkable particulars are the wise institutions of one of the kings, called *Minos*; who for his wisdom and prudence was said to have been made one of the judges of the dead. At what time he lived is uncertain; but no sooner did he ascend the throne than he made the happiness of his people his first object. A wife system of laws he justly thought was what alone could tend to this; and to give these laws the greater weight with his subjects, he fell upon an expedient practised by many other legislators, namely, to pretend that he received them from Jupiter.

This prince occasioned a change in the government, from a monarchy to a republic. According to the spirit of his institutions, the government of Crete was a democracy tempered with an aristocracy. The supreme authority devolved to ten chosen magistrates, who composed their senate. Ten others were afterwards associated with them, who were distinguished by the title of *cosmi*. The former, called *senators*, were established as guardians of the laws and government. They did not rise to that dignity till after they had exercised, for a certain time, the office of *cosmi*; and the latter were appointed to maintain a just medium between the power of the great, and the weakness of the people of whom they were appointed protectors. But the power both of the senators and *cosmi* was limited in such a manner, that they could not enrich themselves during their administration. A magistrate whose duty it was to see that they were put in execution, was obliged to visit thrice every year

the towns depending on the government; and he carried with him tablets, or plates of brass, on which they were engraved. The Cretan laws seem to have been modelled for people who had no other business than to attack enemies or to defend themselves. They were particularly careful of the education of their youth. Masters were appointed, who taught them to repeat, and sing regularly, hymns in honour of the gods and of their laws, and of heroes. They even gave them some tincture of polite learning. The poems of Homer were not unknown in Crete, though they did not hold foreign poets in much estimation.

The Cretans, from their infancy, were accustomed to bear hunger and thirst with patience. As they advanced in years, they were taught the exercises of running, hunting, archery (in which they particularly excelled), the use of the sword, and wrestling. For their martial improvement also the *Pyrrhic dance* was instituted, in which the young men completely imitated the motions and actions of combatants. Thus they were early accustomed to see arms, and their use, without emotion. Indeed no people had greater occasion for learning the art of war than the Cretans, as they were for many ages in perpetual enmity with one another, the inhabitants of each city claiming the sovereignty of the whole island. Hence also they became very useful auxiliaries to other nations. Many of Alexander's victories were owing to the Cretan auxiliaries; and to the archers and slingers brought from this island the Romans were highly indebted, after they became acquainted with it.

One of Minos's institutions which Aristotle much admires was, that all his subjects should use the same diet, and take their repasts together, without any distinction between poor and rich. By this means a kind of equality was introduced among them, they were accustomed to a frugal and sober way of life, and friendships were cemented among them. The public defrayed the charges of these meals; one part of the revenues of the state being applied to the uses of religion, and the salaries of the magistrates; and the rest allotted for the public meals. After their repast, the old men discoursed of the actions and virtues of their ancestors, and of such as had distinguished themselves either by their valour in war, or their wisdom in peace; and the youth, who were present at these entertainments, were exhorted to propose to themselves those great men as examples whom they were to imitate. Another institution greatly admired by Plato was, to inspire the youth with an high regard for the customs, maxims, and laws, of their own country: not suffering them to dispute, or call in question the wisdom of their constitution; but commanded them to look upon the laws as dictated by the gods themselves. He enjoined every one to honour in a particular manner the magistrates and aged persons; and that nothing might lessen the respect due to their age, if any defect was found in them, it was never to be mentioned in the presence of their youth. A custom established by Minos, and afterwards adopted by the Romans, gives us reason to believe, that even the slaves in this island were better treated than any where else; for, at the feasts of Mercury, the masters waited on their slaves at table, and performed about

Crew
Cribration.

about them the same offices which they received from their slaves the rest of the year. The laws of Minos were ancient in so great repute, that Lycurgus passed a considerable time in Crete, employing himself in the study of their constitution, and forming his laws on the model of those which at that time obtained in the island. Plato tells us, that, under the government of his wife a prince, Crete became the abode of virtue, probity, and justice; and that the laws which he established were so well founded in justice and equity, that they subsisted in their full vigour even in his time; that is, above 900 years after they had been first published. It is true the Cretans degenerated by degrees from their ancient probity; and at length, by an entire change of manners, became the most vicious nation known either to the Greeks or Latins. Polybius writes, that the Cretans in his time were interested and avaricious to such a degree as to think no lucre forbidd. Suidas and Callimachus give them the character of liars and impostors. St Paul quotes against them the testimony of one of their own poets, who paints them in very disagreeable colours. The impurity of their amours is too well known from the accounts given us by Strabo, Servius, and Athenæus. These authors inform us, that the unnatural passion of the Cretans for boys proceeded to a degree of madness, and that from them it overspread all Crete. But this change of manners, in whatever time it happened, does not affect the probity of the ancient Cretans, nor lessen the glory of their legislature.

Crete was the most ancient maritime power mentioned by the Greek historians. It is about 600 miles in circumference, though not 1-20th part so large as Great Britain; and this large extent of coast was of great service in this respect*. It was exceedingly fruitful, producing all sorts of grain, fruits, &c. The Cretan wines, particularly, are greatly commended both by ancient and modern writers. From the fruitfulness of its soil, and the purity of its air, it had the appellation of the *fortunate island*; and from its maritime power was styled *empress of the sea*. In ancient times also it had the name of *Hecatonpolis*, as containing 100 cities; 90 of these were built before the Trojan war, and 10 after it. About 66 years before Christ this island fell under the power of the Romans. In the year of Christ 812 it was taken from them by the Saracens, who built the present capital of the island called *Chandax*, or *Gandia*; from whence the whole island has got its modern name of *CANDIA*. It is now subject to the Turks.

CREW, the company of sailors belonging to a ship, boat, or other vessel.

CREX, in ornithology, a species of RALLUS.

CRIB, the rack or manger of a stable, or the stall or cabin of an ox. It is also used for any small habitation, as a cottage, &c.

CRIB, in the English salt-works, a name given to a sort of case used in some places instead of the *drab*, to put the salt into as it is taken out of the boiling pan.

CRIBBAGE, a game at cards, to be learnt only by practice.

CRIBRATION, in pharmacy, the passing any sub-

stance through a sieve, or search, in order to separate the finer particles from the grosser.

CRIBROSUM os, in anatomy, called also *os ethmoides*. See ANATOMY, n° 16.

CRICELASIA, the driving a ring or hoop. Driving a hoop was one of the ancient gymnastics: this hoop was as high as the breast of the person who used it. It was commended for rendering the limbs pliable, and for strengthening the nerves.

CRICHTON (James), known by the appellation of "the admirable Crichton," was born in Perthshire, at Clunie his paternal inheritance, in the year 1557. He studied grammar at the school of Perth, and philosophy at the college of St Andrews.

At the age of 20 years, he thought of improving himself by foreign travel; and having arrived at Paris, the desire of procuring the notice of its university, or the pride of making known his attainments, induced him to affix placards on the gates of its colleges, challenging the professors to dispute with him in all the branches of literature and the sciences, in 10 languages, and either in prose or in verse. On the day appointed 3000 auditors assembled. Fifty masters, who had laboriously prepared for the contest, proposed to him the most intricate questions; and he replied to them in the language they required, with the happiest propriety of expression, with an acuteness that seemed superior to every difficulty, and with an erudition which appeared to have no bounds. Four celebrated doctors of the church then ventured to enter into disputation with him. He obviated every objection they could urge in opposition to him; he refuted every argument they advanced. A sentiment of terror mingled itself with their admiration of him. They conceived him to be Antichrist*.

This singular exhibition continued from nine o'clock in the morning till six at night, and was closed by the president of the university, who having expressed, in the strongest terms of compliment, the sense he entertained of his capacity and knowledge, advanced towards him, accompanied by four professors, and bestowed on him a diamond ring and a purse of gold.

The acclamations of the spectators were frequent and loud; and, what completed the amazement of the university, during the interval which passed from his giving the challenge till the day appointed for accepting it, he applied not to his books. He rather seemed indolently to avoid them. He engaged in parties at cards, and at dice; he exercised himself at tennis, and other youthful sports. This conduct was interpreted to be in derision of that learned society; but whether justly, or individually, we know not; and the students, to support or avenge the cause of their humiliated teachers, fixed a lampoon on the gate of the Sorbonne, intimating, that those who would see this monster of erudition, must look for him at the tavern or the brothel.

Nor, it is said, was this formidable trial attended with any waste of his fire, or usual vivacity. It seemed not an exertion that could fatigue him. The day after, he attended a public match of tilting; and, in the presence of the princes of France, and a great many

Cribrosfum
Cribton.

McKenzie's
Lives;
Boyle, Pen-
nant's Tour;
Adventu-
rer, n° 84.

* See the ar-
ticle *Coast*.

* "Doctores ecclesie quatuor redarguit," says an author who was present, "sapientia comparandus nemini videbatur, pro Antichristo habitus est." Steph. Pasch. Dissert. lib. 5.

Crime and
Punishment

Crime and
Punishment

* As, baron
Montesquieu, mar-
quis de Bec-
caria, &c.

order to check the progress of some very prevalent offence; from some, or from all, of these causes it hath happened, that the criminal law is in every country of Europe more rude and imperfect than the civil. We shall not here enter into any minute enquiries concerning the local constitutions of other nations; the inhumanity and mistaken policy of which have been sufficiently pointed out by ingenious writers of their country. But even with us in Britain, where our crown-law is with justice supposed to be more nearly advanced to perfection; where crimes are more accurately defined, and penalties less uncertain and arbitrary; where all our accusations are public, and our trials in the face of the world; where torture is unknown, and every delinquent is judged by such of his equals, against whom he can form no exception, nor even a personal dislike;—even here we shall occasionally find room to remark some particulars that seem to want revision and amendment. These have chiefly arisen from too scrupulous an adherence to some rules of the ancient common law, when the reasons have ceased upon which those rules were founded; from not repealing such of the old penal laws as are either obsolete or absurd; and from too little care and attention in framing and passing new ones. The enacting of penalties to which a whole nation shall be subject, ought not to be left, as a matter of indifference, to the passions or interests of a few, who upon temporary motives may prefer or support such a bill; but be calmly and maturely considered by persons who know what provisions the laws have already made to remedy the mischief complained of, who can from experience foresee the probable consequences of those which are now proposed, and who will judge without passion or prejudice how adequate they are to the evil. It is never usual in the house of peers even to read a private bill which may affect the property of an individual, without first referring it to some of the learned judges, and hearing their report thereon. And surely equal precaution is necessary, when laws are to be established, which may affect the property, the liberty, and perhaps even the lives, of thousands. Had such a reference taken place, it is impossible that in the 18th century it could ever have been made a capital crime, to break down (however maliciously) the mound of a fishpond, whereby any fish shall escape; or to cut down a cherry-tree in an orchard. Were even a committee appointed but once in an hundred years to revise the criminal law, it could not have continued to this hour a felony without benefit of clergy, to be seen for one month in the company of persons who call themselves or are called *Egyptians*.

It is true, that these outrageous penalties, being seldom or never inflicted, are hardly known to be the law by the public; but that rather aggravates the mischief, by laying a snare for the unwary. Yet they cannot but occur to the observation of any one, who hath undertaken the task of examining the great outlines of our law, and tracing them up to their principles; and it is the duty of such a one to hint them with decency to those, whose abilities and stations enable them to apply the remedy. Proceed we now to consider (in the first place), the general nature of crimes.

Blackf.
Comment.

I. A crime, or misdemeanour, is an act committed, or omitted, in violation of a public law, either forbidding or commanding it. This general definition comprehends both crimes and misdemeanours; which, properly speaking, are mere synonymous terms: though, in common usage, the word “crimes” is made to denote such offences as are of a deeper and more atrocious dye; while smaller faults, and omissions of less consequence, are comprised under the gentler name of “misdemeanours” only.

The distinction of public wrongs from private, of crimes and misdemeanours from civil injuries, seems principally to consist in this: that private wrongs, or civil injuries, are an infringement or privation of the civil rights which belong to individuals, considered merely as individuals; public wrongs, or crimes and misdemeanours, are a breach and violation of the public rights and duties, due to the whole community, considered as a community, in its social aggregate capacity. As if I detain a field from another man, to which the law has given him a right, this is a civil injury, and not a crime; for here only the right of an individual is concerned, and it is immaterial to the public, which of us is in possession of the land: but treason, murder, and robbery are properly ranked among crimes; since, besides the injury done to individuals, they strike at the very being of society; which cannot possibly subsist, where actions of this sort are suffered to escape with impunity.

In all cases the crime includes an injury: every public offence is also a private wrong, and somewhat more; it affects the individual, and it likewise affects the community. Thus treason in imagining the king's death, involves in it conspiracy against an individual, which is also a civil injury: but as this species of treason in its consequences principally tends to the dissolution of government, and the destruction thereby of the order and peace of society, this denominates it a crime of the highest magnitude. Murder is an injury to the life of an individual; but the law of society considers principally the loss which the state sustains by being deprived of a member, and the pernicious example thereby set, for others to do the like. Robbery may be considered in the same view: it is an injury to private property; but, were that all, a civil satisfaction in damages might atone for it: the public mischief is the thing, for the prevention of which our laws have made it a capital offence. In these gross and atrocious injuries the private wrong is swallowed up in the public: we seldom hear any mention made of satisfaction to the individual; the satisfaction to the community being of very great. And indeed, as the public crime is not otherwise avenged than by forfeiture of life and property, it is impossible afterwards to make any reparation for the private wrong: which can only be had from the body or goods of the aggressor. But there are crimes of an inferior nature, in which the public punishment is not so severe, but it affords room for a private compensation also; and herein the distinction of crimes from civil injuries is very apparent. For instance, in the case of battery, or beating another, the aggressor may be indicted for this at the suit of the king, for disturbing the public peace, and be punished criminally by fine and imprisonment.

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fonment: and the party beaten may also have his private remedy by action of trespass for the injury, which he in particular sustains, and recover a civil satisfaction in damages. So also, in case of a public nuisance, as digging a ditch across a highway, this is punishable by indictment, as a common offence to the whole kingdom, and all his majesty's subjects: but if any individual sustains any special damage thereby, as laming his horse, breaking his carriage, or the like, the offender may be compelled to make ample satisfaction, as well for the private injury, as for the public wrong.

II. The nature of crimes and misdemeanours in general being thus ascertained and distinguished, we proceed in the next place to consider the general nature of punishments: Which are evils or inconveniences consequent upon crimes and misdemeanours; being devised, denounced, and inflicted by human laws, in consequence of disobedience or misbehaviour in those, to regulate whose conduct such laws were respectively made. And herein we will briefly consider the *power*, the *end*, and the *measure*, of human punishment.

I. As to the *power* of human punishment, or the right of the temporal legislator to inflict discretionary penalties for crimes and misdemeanours. It is clear, that the right of punishing crimes against the law of nature, as murder and the like, is in a state of mere nature vested in every individual. For it must be vested in somebody; otherwise the laws of nature would be vain and fruitless, if none were empowered to put them in execution: and if that power is vested in any one, it must also be vested in all mankind; since all are by nature equal. Whereof the first murderer Cain was so sensible, that we find him expressing his apprehensions, that whoever should find him would slay him. In a state of society this right is transferred from individuals to the sovereign power; whereby men are prevented from being judges in their own causes, which is one of the evils that civil government was intended to remedy. Whatever power therefore individuals had of punishing offences against the law of nature, that is now vested in the magistrate alone; who bears the sword of justice by the consent of the whole community. And to this precedent natural power of individuals must be referred that right, which some have argued to belong to every state, (though, in fact, never exercised by any), of punishing not only their own subjects, but also foreign ambassadors, even with death itself; in case they have offended, not indeed against the municipal laws of the country, but against the divine laws of nature, and become liable thereby to forfeit their lives for their guilt.

As to offences merely against the laws of society, which are only *mala prohibita*, and not *mala in se*; the temporal magistrate is also empowered to inflict coercive penalties for such transgression: and this by the consent of individuals; who, in forming societies, did either tacitly or expressly invest the sovereign power with a right of making laws, and of enforcing obedience to them when made, by exercising, upon their non-observance, severities adequate to the evil. The lawfulness therefore of punishing such criminals is founded upon this principle, that the law by which they suffer was made by their own consent; it is a

part of the original contract into which they entered, when first they engaged in society; it was calculated for, and has long contributed to, their own security.

This right therefore, being thus conferred by universal consent, gives to the state exactly the same power, and no more, over all its members, as each individual member had naturally over himself or others. Which has occasioned some to doubt, how far a human legislature ought to inflict capital punishments for positive offences; offences against the municipal law only, and not against the law of nature; since no individual has, naturally, a power of inflicting death upon himself or others for actions in themselves indifferent. With regard to offences *mala in se*, capital punishments are in some instances inflicted by the immediate command of God himself to all mankind; as, in the case of murder, by the precept delivered to Noah, their common ancestor and representative, "Whoso sheddeth man's blood, by man shall his blood be shed." In other instances they are inflicted after the example of the Creator, in his positive code of laws for the regulation of the Jewish republic; as in the case of the crime against nature. But they are sometimes inflicted without such express warrant or example, at the will and discretion of the human legislature; as for forgery, for theft, and sometimes for offences of a lighter kind. This practice is thus justified by that great and good man, Sir Matthew Hale: "When offences grow enormous, frequent, and dangerous to a kingdom or state, destructive or highly pernicious to civil societies, and to the great security and danger of the kingdom or its inhabitants, severe punishment and even death itself is necessary to be annexed to laws in many cases by the prudence of lawgivers." It is therefore the enormity, or dangerous tendency, of the crime, that alone can warrant any earthly legislature in putting him to death that commits it. It is not its frequency only, or the difficulty of otherwise preventing it, that will excuse our attempting to prevent it by a wanton effusion of human blood. For, though the end of punishment is to deter men from offending, it never can follow from thence, that it is lawful to deter them at any rate and by any means; since there may be unlawful methods of enforcing obedience even to the justest laws. Every humane legislator will be therefore extremely cautious of establishing laws that inflict the penalty of death, especially for slight offences, or such as are merely positive. He will expect a better reason for his so doing, than that loose one which generally is given; that it is found by former experience that no lighter penalty will be effectual. For is it found upon farther experience, that capital punishments are more effectual? Was the vast territory of all the Russias worse regulated under the late empress Elizabeth, than under her more languinary predecessors? Is it now, under Catherine II. less civilized, less social, less secure? And yet we are assured, that neither of these illustrious princesses have, throughout their whole administration, inflicted the penalty of death: and the latter has, upon full persuasion of its being useless, nay even pernicious, given orders for abolishing it entirely throughout her extensive dominions. But indeed, were capital punishments proved by experience to be

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a sure and effectual remedy, that would not prove the necessity (upon which the justice and propriety depend) of inflicting them upon all occasions when other expedients fail. It is feared this reasoning would extend a great deal too far. For instance, the damage done to our public roads by loaded waggons is universally allowed, and many laws have been made to prevent it, none of which have hitherto proved effectual. But it does not therefore follow, that it would be just for the legislature to inflict death upon every obstinate carrier, who defeats or eludes the provisions of former statutes. Where the evil to be prevented is not adequate to the violence of the preventive, a sovereign that thinks seriously can never justify such a law to the dictates of conscience and humanity. To shed the blood of our fellow-creature is a matter that requires the greatest deliberation, and the fullest conviction of our own authority: for life is the immediate gift of God to man; which neither he can resign, nor can it be taken from him, unless by the command or permission of him who gave it, either expressly revealed, or collected from the laws of nature or society by clear and indisputable demonstration.

We would not be understood to deny the right of the legislature in any country to enforce its own laws by the death of the transgressor, though persons of some abilities have doubted it; but only to suggest a few hints for the consideration of such as are, or may hereafter become, legislators. When a question arises, whether death may be lawfully inflicted for this or that transgression, the wisdom of the laws must decide it: and to this public judgment or decision all private judgments must submit; else there is an end of the first principle of all society and government. The guilt of blood, if any, must lie at their doors, who misinterpret the extent of their warrant; and not at the doors of the subjects, who is bound to receive the interpretations that are given by the sovereign power.

2. As to the end, or final cause, of human punishments. This is not by way of atonement or expiation for the crime committed; for that must be left to the just determination of the Supreme Being: but as a precaution against future offences of the same kind. This is effected three ways: either by the amendment of the offender himself; for which purpose all corporeal punishments, fines, and temporary exile or imprisonment, are inflicted: or, by deterring others by the dread of his example from offending in the like way, "ut pœna (as Tully expresses it) ad paucos, "metus ad omnes, perveniat;" which gives rise to all ignominious punishments, and to such executions of justice as are open and public: or, lastly, by depriving the party injuring the power to do future mischief; which is effected by either putting him to death, or condemning him to perpetual confinement, slavery, or exile. The same end, of preventing future crimes, is endeavoured to be answered by each of these three species of punishment. The public gains equal security, whether the offender himself be amended by wholesome correction, or whether he be disabled from doing any farther harm: and if the penalty fails of both these effects, as it may do, still the terror of his example remains as a warning to other citizens. The method however of inflicting punish-

ment ought always to be proportioned to the particular purpose it is meant to serve, and by no means to exceed it: therefore the pains of death, and perpetual disability by exile, slavery, or imprisonment, ought never to be inflicted, but when the offender appears incorrigible: which may be collected either from a repetition of minuter offences; or from the perpetration of some one crime of deep malignity, which of itself demonstrates a disposition without hope or probability of amendment: and in such cases it would be cruelty to the public to defer the punishment of such a criminal till he had an opportunity of repeating perhaps the worst of villainies.

3. As to the measure of human punishments. From what has been observed in the former articles we may collect, that the quantity of punishment can never be absolutely determined by any standing invariable rule; but it must be left to the arbitration of the legislature to inflict such penalties as are warranted by the laws of nature and society, and such as appear to be the best calculated to answer the end of precaution against future offences.

Hence it will be evident, that what some have so highly extolled for its equity, the *lex talionis* or "law of retaliation," can never be in all cases an adequate or permanent rule of punishment. In some cases indeed it seems to be dictated by natural reason; as in the case of conspiracies to do an injury, or false accusations of the innocent; to which we may add that law of the Jews and Egyptians, mentioned by Josephus and Diodorus Siculus, that whoever without sufficient cause was found with any mortal poison in his custody, should himself be obliged to take it. But, in general, the difference of persons, place, time, provocation, or other circumstances, may enhance or mitigate the offence; and in such cases retaliation can never be a proper measure of justice. If a nobleman strikes a peasant, all mankind will see, that if a court of justice awards a return of the blow, it is more than a just compensation. On the other hand, retaliation may sometimes be too easy a sentence; as, if a man maliciously should put out the remaining eye of him who had lost one before, it is too slight a punishment for the maimer to lose only one of his: and therefore the law of the Locrians, which demanded an eye for an eye, was in this instance judiciously altered; by decreeing, in imitation of Solon's laws, that he who struck out the eye of a one-eyed man, should lose both his own in return. Besides, there are very many crimes, that will in no shape admit of these penalties, without manifest absurdity and wickedness. Theft cannot be punished by theft, defamation by defamation, forgery by forgery, adultery by adultery, and the like. And we may add, that those instances, wherein retaliation appears to be used, even by the divine authority, do not really proceed upon the rule of exact retribution, by doing to the criminal the same hurt he has done to his neighbour, and no more; but this correspondence between the crime and punishment is barely a consequence from some other principle. Death is ordered to be punished with death; not because one is equivalent to the other, for that would be expiation, and not punishment. Nor is death always an equivalent for death: the execution of a needy decrepid assassin is a

poor satisfaction for the death of a nobleman in the bloom of his youth, and full enjoyment of his friends, his honours, and his fortune. But the reason upon which this sentence is grounded seems to be, that this is the highest penalty that man can inflict, and tends most to the security of the world; by removing one murderer from the earth, and setting a dreadful example to deter others: so that even this grand instance proceeds upon other principles than those of retaliation. And truly, if any measure of punishment is to be taken from the damage sustained by the sufferer, the punishment ought rather to exceed than equal the injury: since it seems contrary to reason and equity, that the guilty (if convicted) should suffer no more than the innocent has done before him; especially as the suffering of the innocent is past and irrevocable, that of the guilty is future, contingent, and liable to be escaped or evaded. With regard indeed to crimes that are incomplete, which consist merely in the intention, and are not yet carried into act, as conspiracies and the like: the innocent has a chance to frustrate or avoid the villainy, as the conspirator has also a chance to escape his punishment: and this may be one reason why the *lex talionis* is more proper to be inflicted, if at all, for crimes that consist in intention, than for such as are carried into act. It seems indeed consonant to natural reason, and has therefore been adopted as a maxim by several theoretical writers, that the punishment, due to the crime of which one falsely accuses another, should be inflicted on the perjured informer. Accordingly, when it was once attempted to introduce into England the law of retaliation, it was intended as a punishment for such only as preferred malicious accusations against others; it being enacted by statute 37 Edw. III. c. 18. that such as preferred any suggestions to the king's great council should put in furies of taliation; that is, to incur the same pain that the other should have had, in case the suggestion were found untrue. But, after one year's experience, this punishment of taliation was rejected, and imprisonment adopted in its stead.

But though from what has been said it appears, that there cannot be any regular determinate method of rating the quantity of punishments for crimes, by any one uniform rule; but they must be referred to the will and discretion of the legislative power: yet there are some general principles, drawn from the nature and circumstances of the crime, that may be of some assistance in allotting it an adequate punishment.

As, first, with regard to the object of it: for the greater and more exalted the object of an injury is, the more care should be taken to prevent that injury, and of course under this aggravation the punishment should be more severe. Therefore treason in conspiring the king's death is (in Britain) punished with greater rigour than even actually killing any private subject. And yet, generally, a design to transgress is not so flagrant an enormity, as the actual completion of that design. For evil, the nearer we approach it, is the more disagreeable and shocking; so that it requires more obliquity in wickedness

to perpetrate an unlawful action, than barely to entertain the thought of it: and it is an encouragement to repentance and remorse, even till the last stage of any crime, that it never is too late to retract; and that if a man stops even here, it is better for him than if he proceeds: for which reasons an attempt to rob, to ravish, or to kill, is far less penal than the actual robbery, rape, or murder. But in the case of a treasonable conspiracy, the object whereof is the king's majesty, the bare intention will deserve the highest degree of severity: not because the intention is equivalent to the act itself; but because the greatest rigour is no more than adequate to a treasonable purpose of the heart, and there is no greater left to inflict upon the actual execution itself.

Again: The violence of passion, or temptation, may sometimes alleviate a crime; as theft, in case of hunger, is far more worthy of compassion, than when committed through avarice, or to supply one in luxurious excesses. To kill a man upon sudden and violent resentment is less penal than upon cool deliberate malice. The age, education, and character, of the offender; the repetition (or otherwise) of the offence; the time, the place, the company wherein it was committed; all these, and a thousand other incidents, may aggravate or extenuate the crime*.

Farther: As punishments are chiefly intended for the prevention of future crimes, it is but reasonable that among crimes of different natures those should be most severely punished, which are the most destructive of the public safety and happiness: and, among crimes of an equal malignity, those which a man has the most frequent and early opportunities of committing, which cannot be so easily guarded against as others, and which therefore the offender has the strongest inducement to commit: according to what Cicero observes, "*ea sunt animadvertenda peccata maxime, quae diffisillime praecaventur.*" Hence it is, that for a servant to rob his master is in more cases capital, than for a stranger: if a servant kills his master, it is a species of treason; in another it is only murder: to steal a handkerchief, or other trifle of above the value of twelvence, privately from one's person, is made capital; but to carry off a load of corn from an open field, though of fifty times greater value, is punished with transportation only. And, in the island of Man, this rule was formerly carried so far, that to take away an horse or an ox was there no felony, but a trespass, because of the difficulty in that little territory to conceal them or carry them off: but to steal a pig or a fowl, which is easily done, was a capital misdemeanour, and the offender was punished with death.

Lastly, as a conclusion to the whole, we may observe, that punishments of unreasonable severity, especially when indiscriminately inflicted, have less effect in preventing crimes, and amending the manners of a people, than such as are more merciful in general, yet properly intermixed with due distinctions of severity. It is the sentiment of an ingenious writer, who seems to have well studied the springs of human action, that crimes are more effectually prevented by the certain-

* Thus Demosthenes (in his oration against Midias) finely works up the aggravations of the insults he had received. "I was abused, (says he), by my enemy, in cold blood, out of malice, not by heat of wine, in the morning, publicly, before strangers as well as citizens; and that in the temple, whither the duty of my office called me."

ty, than by the severity, of punishment. For the excessive severity of laws (says Montaigne) hinders their execution: when the punishment surpasses all measure, the public will frequently out of humanity prefer impunity to it. Thus also the statute 1 Mar. II. c. 1. recites in its preamble, "that the state of every king consists more assuredly in the love of the subject towards their prince, than in the dread of laws made with rigorous pains; and that laws made for the preservation of the commonwealth without great penalties are more often obeyed and kept, than laws made with extreme punishments." Happy had it been for the nation, if the subsequent practice of that deluded prince in matters of religion, had been correspondent to these sentiments of herself and parliament, in matters of state and government! We may farther observe, that sanguinary laws are a bad symptom of the distemper of any state, or at least of its weak constitution. The laws of the Roman kings, and the twelve tables of the *decemviri*, were full of cruel punishments: the Porcian law, which exempted all citizens from sentence of death, silently abrogated them all. In this period the republic flourished: under the emperors severe punishments were revived; and then the empire fell.

It is moreover absurd and impolitic to apply the same punishment to crimes of different malignity. A multitude of sanguinary laws (besides the doubt that may be entertained concerning the right of making them) do likewise prove a manifest defect either in the wisdom of the legislative, or the strength of the executive, power. It is a kind of quackery in government, and argues a want of solid skill, to apply the same universal remedy, the *ultimum supplicium*, to every case of difficulty. It is, it must be owned, much easier to extirpate than to amend mankind; yet that magistrate must be esteemed both a weak and a cruel surgeon, who cuts off every limb, which through ignorance or indolence he will not attempt to cure. It has been therefore ingeniously proposed, that in every state a scale of crimes should be formed, with a corresponding scale of punishments, descending from the greatest to the least: but, if that be too romantic an idea, yet at least a wise legislator will mark the principal divisions, and not assign penalties of the first degree to offences of an inferior rank. Where men see no distinction made in the nature and gradations of punishment, the generality will be led to conclude there is no distinction in the guilt. Thus in France the punishment of robbery, either with or without murder, is the same: hence it is, that though perhaps they are therefore subject to fewer robberies, yet they never rob but they also murder. In China murderers are cut to pieces, and robbers not: hence in that country they never murder on the highway, though they often rob. And in Britain, besides the additional terrors of a speedy execution, and a subsequent exposure or dissection, robbers have a hope of transportation, which seldom is extended to murderers. This has the same effect here as in China; in preventing frequent assassination and slaughter.

Yet, though in this instance we may glory in the wisdom of our law, we shall find it more difficult to justify the frequency of capital punishment to be

found therein; inflicted (perhaps inattentively) by a multitude of successive independent statutes, upon crimes very different in their natures. It is a melancholy truth, that among the variety of actions which men are daily liable to commit, no less than 160 have been declared by act of parliament to be felonies without benefit of clergy; or, in other words, to be worthy of instant death. So dreadful a list, instead of diminishing, increases the number of offenders. The injured, through compassion, will often forbear to prosecute: juries, through compassion, will sometimes forget their oaths, and either acquit the guilty or mitigate the nature of the offence: and judges, through compassion, will respite one-half of the convicts, and recommend them to the royal mercy. Among so many chances of escaping, the needy and hardened offender overlooks the multitude that suffer; he boldly engages in some desperate attempt, to relieve his wants or supply his vices; and, if unexpectedly the hand of justice overtakes him, he deems himself peculiarly unfortunate, in falling at last a sacrifice to those laws, which long impunity has taught him to contemn.

As to the trials and mode of punishment, see *ARRAIGNMENT*; *TRIAL*, and the references therefrom; *CONVICTION*; *JUDGEMENT*; *ATTAINDER*; *CORRUPTION OF BLOOD*; *FORFEITURE*; *EXECUTION*; the several *Crimes* under their respective names; and *LAW*, Part II. cxxii. *et seq.* and Part III. clxxvi.

Persons capable, or incapable, of committing CRIMES; or (which is all one) of suffering the censures of the law upon the commission of forbidden acts.

All the several pleas and excuses, which protect the committer of a forbidden act from the punishment which is otherwise annexed thereto, may be reduced to this single consideration, the want or defect of *will*. An involuntary act, as it has no claim to merit, so neither can it induce any guilt: the concurrence of the will, when it has its choice either to do or to avoid the fact in question, being the only thing that renders human actions either praise-worthy or culpable. Indeed, to make a complete crime, cognizable by human laws, there must be both a will and an act. For though, in *foro conscientie*, a fixed design or will to do an unlawful act is almost as heinous as the commission of it; yet, as no temporal tribunal can search the heart, or fathom the intentions of the mind, otherwise than as they are demonstrated by outward actions, it therefore cannot punish for what it cannot know. For which reason, in all temporal jurisdictions, an *overt act*, or some open evidence of an intended crime, is necessary, in order to demonstrate the depravity of the will, before the man is liable to punishment. And as a vitious will without a vitious act is no civil crime, so, on the other hand, an unwarrantable act without a vitious will is no crime at all. So that to constitute a crime against human laws, there must be, first, a vitious will; and, secondly, an unlawful act consequent upon such vitious will.

Now there are three cases, in which the will does not join with the act: 1. When there is a defect of understanding. For where there is no discernment, there is no choice; and where there is no choice, there

there can be no act of the will, which is nothing else but a determination of one's choice to do or to abstain from a particular action: he, therefore, that has no understanding, can have no will to guide his conduct. 2. Where there is understanding and will sufficient, refusing in the party; but not called forth and exerted at the time of the action done; which is the case of all offences committed by chance or ignorance. Here the will fits neuter; and neither concurs with the act, nor disagrees to it. 3. Where the action is constrained by some outward force and violence. Here the will counteracts the deed; and is so far from concurring with, that it loaths and disagrees to, what the man is obliged to perform. Infancy, idiocy, lunacy, and intoxication, fall under the first class; misfortune, and ignorance may be referred to the second; and compulsion or necessity may properly rank in the third. See INFANCY, IDIOCY, DRUNKENNESS, MISFORTUNE, IGNORANCE, NECESSITY.

CRIMSON, one of the seven red colours of the dyes. See DYING.

CRINGLE, a small hole made in the bolt-rope of a sail, by intertwining one of the divisions of a rope, called a *strand*, alternately round itself and through the *strands* of the bolt-rope, till it becomes threefold, and assumes the shape of a wreath or ring. The use of the cringle is generally to contain the end of some rope, which is fastened thereto for the purpose of drawing up the sail to its yard, or of extending the skirts by the means of *bridles*, to stand upon a side wind. The word seems to be derived from *krinckelen* (Belg.) to run into twists.

CRINUM, ASPHODEL-LILY; a genus of the monogynia order, belonging to the hexandria class of plants. They are very beautiful green-house plants, rising two or three feet high, each of them crowned by a large umbellate cluster of spathaceous, monopetalous, long funnel-shaped flowers; blue, white, or striped, having a very fragrant smell. They are propagated by off-sets.

CRISIS, in medicine, is used in different senses, both by the ancient and modern physicians. With some it means frequently no more than the excretion of any noxious substance from the body. Others take the word for a secretion of the noxious humours made in a fever. Others use it for the critical motion itself; and Galen defines a crisis in fevers, a sudden and instantaneous change, either for the better or the worse, productive of recovery or death.

CRISTÆ, in surgery, a term for certain excrescences about the anus and pudenda. See (the *Index* subjoined to) MEDICINE.

CRISTA GALLI. See ANATOMY, n° 16. b.

CRITERION, or CRITERIUM, a standard by which propositions and opinions are compared, in order to discover their truth or falsehood.

CRITHE, in surgery, commonly called the *fly*, is a sort of tubercle that grows on the eye-lids. When small, it is seated on the edge of the eye-lid; but when large, it spreads further. When they do not suppurate, they become wens. They are apt to disappear and return. If there is inflammation, endeavour to suppurate it with the white-bread poultice: if it is hard, destroy it with a mixture of equal parts of

hog's lard and quicksilver. If the lower eye-lid is affected, the tumour is more frequently on its inside; and then it is best to dissect it, or to make way for it outwardly by applying a caustic on the skin just upon it.

CRITHMUM, SAMPHIRE; a genus of the digynia order, belonging to the pentandria class of plants. There are two species, the principal of which is the maritimum, or common maritime samphire. It hath a fibrous penetrating root; thick, succulent, branchy stalks rising two feet high, winged fleshy leaves consisting of many small spear-shaped lobes; with round yellow flowers growing in umbels. It is produced naturally on the sea-coasts among the gravel and rocks. Its leaves are an excellent pickle used for sauces, and are by many eaten raw in salads. It is of a saltish relish, palatable, and comfortable to the stomach. It is not very easily preserved in gardens. It must be sown on gravelly or rocky ground, half an inch deep; in which situation the plants will come up, and last some years. The leaves of this plant are said also to be aperient and diuretic.

CRITICAL DAYS AND SYMPTOMS, among physicians, are certain days and symptoms in the course of acute diseases, which indicate the patient's state, and determine him either to recover or grow worse. See (*Index* subjoined to) MEDICINE.

CRITICISM, the art of judging with propriety concerning any object or combination of objects. But, in a more limited sense, the science of criticism is confined to the fine arts. The principles of the fine arts are best unfolded by studying the sensitive part of our nature, and by learning what objects are naturally agreeable, and what are naturally disagreeable. The man who aspires to be a critic in these arts, must pierce still deeper: he must clearly perceive what objects are lofty, what low, what are proper or improper, what are many, and what are mean or trivial. Hence a foundation for judging of taste, and for reasoning upon it: where it is conformable to principles, we can pronounce with certainty, that it is correct; otherwise, that it is incorrect, and perhaps whimsical. Thus the fine arts, like morals, become a rational science; and, like morals, may be cultivated to a high degree of refinement.

Manifold are the advantages of criticism, when thus studied as a rational science. In the first place, a thorough acquaintance with the principles of the fine arts, redoubles the entertainment these arts afford. To the man who resigns himself entirely to sentiment or feeling, without interposing any sort of judgment, poetry, music, painting, are mere pastime; in the prime of life, indeed, they are delightful, being supported by the force of novelty, and the heat of imagination; but they lose their relish gradually with their novelty; and are generally neglected in the maturity of life, which disposes to more serious and more important occupations. To those who deal in criticism as a regular science, governed by just principles, and giving scope to judgment as well as to fancy, the fine arts are a favourite entertainment; and in old age maintain that relish which they produce in the morning of life.

In the next place, a philosophical inquiry into the principles

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Criticism.

Criticism.

principles of the fine arts, inures the reflecting mind to the most enticing sort of logic: the practice of reasoning upon subjects so agreeable tends to a habit; and a habit strengthening the reasoning faculties, prepares the mind for entering into subjects more difficult and abstract. To have, in this respect, a just conception of the importance of criticism, we need but reflect upon the common method of education; which, after some years spent in acquiring languages, hurries us, without the least preparatory discipline, into the most profound philosophy: a more effectual method to alienate the tender mind from abstract science, is beyond the reach of invention: and accordingly, with respect to such speculations, the bulk of our youth contract a sort of hobgoblin terror, which is seldom, if ever subdued. Those who apply to the arts, are trained in a very different manner: they are led, step by step, from the easier parts of the operation, to what are more difficult; and are not permitted to make a new motion, till they be perfected in those which regularly precede it. The science of criticism appears then to be a middle link, connecting the different parts of education into a regular chain. This science furnisheth an inviting opportunity to exercise the judgment: we delight to reason upon subjects that are equally pleasant and familiar; we proceed gradually from the simpler to the more involved cases: and in a due course of discipline, custom, which improves all our faculties, bestows acuteness upon those of reason, sufficient to unravel all the intricacies of philosophy.

Nor ought it to be overlooked, that the reasonings employed upon the fine arts are of the same kind with those which regulate our conduct. Mathematical and metaphysical reasonings have no tendency to improve social intercourse; nor are they applicable to the common affairs of life: but a just taste in the fine arts, derived from rational principles, furnishes elegant subjects for conversation, and prepares us finely for acting in the social state with dignity and propriety.

The science of rational criticism tends to improve the heart not less than the understanding. It tends, in the first place, to moderate the selfish affections: by sweetening and harmonizing the temper, it is a strong antidote to the turbulence of passion and violence of pursuit: it procures to a man so much mental enjoyment, that in order to be occupied, he is not tempted in youth to precipitate into hunting, gaming, drinking; nor in middle-age, to deliver himself over to ambition; nor in old-age, to avarice. Pride and envy, two disgusting passions, find in the constitution no enemy more formidable than a delicate and discerning taste: the man upon whom nature and culture have bestowed this blessing, feels great delight in the virtuous dispositions and actions of others: he loves to cherish them, and to publish them to the world: faults and failings, it is true, are to him not less obvious; but these he avoids, or removes out of sight, because they give him pain. On the other hand, a man void of taste, upon whom the most striking beauties make but a faint impression, has no joy but in gratifying his pride or envy by the discovery of errors and blemishes. In a word, there may be other passions, which, for a season, disturb the peace of society more than those men-

tioned; but no other passion is so unwearied an antagonist to the sweets of social intercourse: these passions, tending assiduously to their gratification, put a man perpetually in opposition to others; and dispose him more to relish bad than good qualities, even in a companion. How different that disposition of mind, where every virtue in a companion or neighbour, is, by refinement of taste, set in its strongest light; and defects or blemishes, natural to all, are suppressed, or kept out of view!

In the next place, delicacy of taste tends not less to invigorate the social affections, than to moderate those that are selfish. To be convinced of this tendency, we need only reflect, that delicacy of taste necessarily heightens our sensibility of pain and pleasure, and of course our sympathy, which is the capital branch of every social passion. Sympathy, in particular, invites a communication of joys and sorrows, hopes and fears: such exercise, soothing and satisfactory in itself, is necessarily productive of mutual good-will and affection.

One other advantage of rational criticism is referred to the last place, being of all the most important; which is, that it is a great support to morality. No occupation attaches a man more to his duty than that of cultivating a taste in the fine arts: a just relish of what is beautiful, proper, elegant, and ornamental, in writing or painting, in architecture or gardening, is a fine preparation for the same just relish of these qualities in character and behaviour. To the man who has acquired a taste so acute and accomplished, every action wrong or improper, must be highly disgusting: if, in any instance, the overbearing power of passion sway him from his duty, he returns to it upon the first reflection, with redoubled resolution never to be swayed a second time: he has now an additional motive to virtue, a conviction derived from experience, that happiness depends on regularity and order, and that a disregard to justice or propriety never fails to be punished with shame and remorse.

For the rules of criticism, applicable to the fine arts, and derived from human nature, see ARCHITECTURE, BEAUTY, CONGRUITY, COMPARISON, GRANDEUR, &c.

CRITO, an Athenian philosopher, flourished 400 years before Christ. He was one of the most zealous disciples of Socrates, and supplied him with whatever he wanted. He had several scholars who proved great men, and he composed some dialogues which are lost.

CROATIA, a part of the ancient Illyricum, is bounded on the east by Slavonia and Bosnia, on the south and south-west by Morlachia, and on the north by the Drave, which separates it from a part of Slavonia. It is about 80 miles in length, and 70 in breadth; and was once divided between the Hungarians and Turks; but now the greatest part of it is subject to the house of Austria. The Croats derive their origin from the Slavi; and their language is a dialect of the Slavonian, approaching very near to that of the Poles. The country is divided into two parts; viz. that under, and that beyond, the Save. In the late wars between the empress queen and the king of Prussia, no less than 50,000 men were raised out of this small territory. Both horse and foot are good soldiers, especially the former.

The

Crito
Croatia.

Crocodylus. The foil, where cultivated, is fruitful in wine and oil, &c. but being a frontier country, and much exposed to inroads, it is not so well cultivated as otherwise it might be.

CROCODYLE, in zoology. See **LACERTA**.

Fossile CROCODYLE, one of the greatest curiosities in the fossile world which the late ages have produced. It is the skeleton of a large crocodile, almost entire, found at a great depth under ground, bedded in stone. This was in the possession of Linkius, who wrote many pieces of natural history, and particularly an accurate description of this curious fossile. It was found in the side of a large mountain in the midland part of Germany, and in a stratum of black fossile stone, somewhat like our common slate, but of a coarser texture, the same with that in which the fossile fish in many parts of the world are found. This skeleton had the back and ribs very plain, and was of a much deeper black than the rest of the stone; as is also the case in the fossile fishes which are preserved in this manner. The part of the stone where the head lay was not found; this being broken off just at the shoulders, but that irregularly; so that, in one place, a part of the back of the head was visible in its natural form. The two shoulder bones were very fair, and three of the feet were well preserved; the legs were of their natural shape and size, and the feet preserved even to the extremities of the five toes of each.

CROCUS, SAFFRON; a genus of the monogynia order, belonging to the triandria class of plants. Modern botanists allow only one species of this genus, which, however, comprehends many beautiful varieties. This hath a small roundish, brown, bulbous root, compressed at the bottom. Directly from the root issue many long narrow leaves, of a deep green colour; and amidst them the flowers all protruded from a thin univalvular, radical spatula; the tube of the flower is long, standing on the root, and serving as a foot-stalk to the limb, or upper part, which is erect, six-parted, widens gradually upward, and grows from about three to five or six inches high. The varieties of this species may be divided into two classes, the autumnal and spring flowering.

The varieties of the first are the *crocus officinalis*, or saffron of the shops; for the properties of which, and its cultivation for sale, see the article **SAFFRON**. This hath a long-tubed bluish purple flower, with three stigmata of a fine golden colour. Other varieties are the autumnal small blue crocus; deep blue, sky-blue, whitish blue, many-flowered whitish blue, purple, large rush-leaved purple, autumnal white crocus, and autumnal yellow crocus. The varieties of the vernal crocus are, the small and large, and golden yellow crocuses, and the yellow black-striped, the yellow purple-striped and double cloth of gold ones; the white, white purple-striped, white purple bottom, white black-striped, whitish cream-coloured, whitish ash-coloured, little narrow-leaved white, and white blue-striped crocuses. Besides these there are a great many others of a blue and purple colour finely variegated.

The autumnal crocuses flower about the beginning of October, but never ripen their seeds in this country. They are very beautiful if sown in patches in

the front of borders or in beds by themselves, and every proper ornaments for gardens of every extent, as coming up at a time when most other flowers are on the decay. They grow freely in any kind of foil, and may be propagated by offsets. The vernal kinds flower in February, March, and April. They also are very ornamental, and are so hardy that they will grow almost any where. They are propagated by seeds, which the plants produce in plenty.

CROCUS, in chemistry, denotes any metal calcined to a red or deep yellow colour.

CROCUS Metallorum, an emetic preparation of antimony and nitre. See **CHEMISTRY**, n° 459.

CRÆSUS, the fifth and last king of Lydia, 544 B. C. He made the Greeks of Asia tributary; subdued the Phrygians, Mysians, Paphlagonians, Thracians, and Carians; amassed together immense riches; and became one of the most powerful and magnificent princes in the world. He drew the learned to his court, and took a pleasure in conversing with them. One day as he was enumerating his riches, and magnifying the felicity of his reign, Solon gave a check to his vanity, by saying, that we ought to consider no man happy before his death. Cræsus ridiculed this reflection, but soon he himself experienced its truth: for, being defeated by Cyrus, he shut himself up in Sardis, the capital of his empire. The city was taken by assault; and, as a Persian soldier was going to kill Cræsus, that prince's only surviving son, who had hitherto been dumb, terrified at his danger, cried, *Stop, soldier, and lay not thy hand on Cræsus*. Cræsus was then conducted to Cyrus, who caused him to be laid on a funeral pile; when, reflecting on Solon's words, he cried, *O Solon, Solon!* Cyrus desired to know what he meant; and, being told the reason of this exclamation, was so moved, that he recalled his sentence, and treated him with great respect.

CROFT, a little clole adjoining to a dwelling-house, and inclosed for pasture or arable land, or any other purpose.

CROISADE, or CRUSADE, a name given to the expeditions of the Christians against the infidels for the conquest of Palestine.

These expeditions commenced in the year 1091. The foundation of them was a superstitious veneration for those places where our Saviour performed his miracles, and accomplished the work of man's redemption. Jerusalem had been taken, and Palestine conquered, by Omar the successor of Abu Becr*, who succeeded Mahomet himself. This proved a considerable interruption to the pilgrims, who flocked from all quarters to perform their devotions at the holy sepulchre. They had, however, still been allowed this liberty, on paying a small tribute to the Saracen caliphs, who were not much inclined to molest them. But, in 1055, this city changed its masters. The Turks took it from the Saracens; and being much more fierce and barbarous than the former, the pilgrims now found they could no longer perform their devotions with the same safety they did before. An opinion was about this time also prevalent in Europe, which made these pilgrimages much more frequent than formerly. It was somehow or other imagined, that the thousand years mentioned in the 20th chapter

Crocus
↓
Croifade.

* See *Arabian*, n° 76.

Croisade.

of the Revelations, were fulfilled; that Christ was soon to make his appearance in Palestine, to judge the world; and consequently that journeys to that country were in the highest degree meritorious, and even absolutely necessary. The multitudes of pilgrims which now flocked to Palestine meeting with a very rough reception from the Turks, filled all Europe with complaints against those infidels who profaned the holy city by their presence, and derided the sacred mysteries of Christianity even in the place where they were fulfilled. Pope Gregory VII. had formed a design of uniting all the princes of Christendom against the Mahometans; but his exorbitant encroachments upon the civil power of princes had created him so many enemies, and rendered his schemes so suspicious, that he was not able to make great progress in this undertaking. The work was reserved for a meaner instrument.

Peter, commonly called the *hermit*, a native of Amiens in Picardy, had made the pilgrimage to Jerusalem; and being deeply affected with the dangers to which that act of piety now exposed the pilgrims, as well as with the oppression under which the eastern Christians now laboured, formed the bold, and, in all appearance, impracticable design of leading into Asia, from the farthest extremities of the West, armies sufficient to subdue those potent and warlike nations that now held the Holy Land in slavery. He proposed his scheme to Martin II. who then filled the papal chair; but he, though sensible enough of the advantages which must accrue to himself from such an undertaking, resolved not to interpose his authority till he saw a greater probability of success. He summoned, at Placentia, a council consisting of 4000 ecclesiastics, and 30,000 seculars. As no hall could be found large enough to contain such a multitude, the assembly was held in a plain. Here the Pope himself, as well as Peter, harangued the people, representing the dismal situation of their brethren in the East, and the indignity offered to the Christian name in allowing the holy city to remain in the hands of the infidels. These speeches were so agreeable to those who heard them, that the whole multitude suddenly and violently declared for the war, and solemnly devoted themselves to perform this service, which they believed to be so meritorious in the sight of God.

But though Italy seemed to have embraced the design with ardour, Martin yet thought it necessary, in order to insure perfect success, to engage the greater and more warlike nations in the same enterprise. Having therefore exhorted Peter to visit the chief cities and sovereigns of Christendom, he summoned another council at Clermont in Auvergne. The fame of this great and pious design being now universally diffused, procured the attendance of the greatest prelates, nobles, and princes; and when the Pope and the hermit renewed their pathetic exhortations, the whole assembly, as if impelled by an immediate inspiration, exclaimed with one voice, "It is the will of God! it is the will of God!" These words were deemed so memorable, and so much the effect of a divine impulse, that they were employed as the signal of rendezvous and battle in all future exploits of these adventurers. Men of all ranks now flew to arms with the utmost

ardour, and a cross was affixed to their right shoulder by all who enlisted in this holy enterprise.

At this time Europe was sunk in the most profound ignorance and superstition. The ecclesiastics had gained the greatest ascendancy over the human mind; and the people, who committed the most horrid crimes and disorders, knew of no other expiation than the observances imposed on them by their spiritual pastors.

But amidst the abject superstition which now prevailed, the military spirit had also universally diffused itself; and, though not supported by art or discipline, was become the general passion of the nations governed by the feudal law. All the great lords possessed the right of peace and war. They were engaged in continual hostilities with one another: the open country was become a scene of outrage and disorder: the cities, still mean and poor, were neither guarded by walls, nor protected by privileges. Every man was obliged to depend for safety on his own force, or his private alliances; and valour was the only excellence which was held in esteem, or gave one man the pre-eminence above another. When all the particular superstitions, therefore, were here united in one great object, the ardour for private hostilities took the same direction; "and all Europe, (as the princess Anna Commena expresses herself), torn from its foundations, seemed ready to precipitate itself in one united body upon Asia."

All orders of men, now deeming the croisades the only road to heaven, were impatient to open the way with their swords to the holy city. Nobles, artisans, peasants, even priests, enrolled their names; and to decline this service was branded with the reproach of impurity or cowardice. The nobles who enlisted themselves were moved, by the romantic spirit of the age, to hope for opulent establishments in the East, the chief seat of arts and commerce at that time. In pursuit of these chimerical projects, they sold at the lowest price their ancient castles and inheritances, which had now lost all value in their eyes. The infirm and aged contributed to the expedition by presents and money; and many of them, not satisfied with this, attended it in person, being determined, if possible, to breathe their last in fight of that city where their Saviour had died for them. Women themselves, concealing their sex under the disguise of armour, attended the camp; and commonly forgot their duty still more, by prostituting themselves to the army. The greatest criminals were forward in a service which they considered as an expiation for all crimes; and the most enormous disorders were, during the course of these expeditions, committed by men inured to wickedness, encouraged by example, and impelled by necessity. The multitude of adventurers soon became so great, that their more sagacious leaders became apprehensive lest the greatness of the armament would be the cause of its own disappointment. For this reason they permitted an undisciplined multitude, computed at 300,000 men, to go before them under the command of Peter the hermit, and *Gautier*, or *Walter*, surnamed "the moneyless," from his being a soldier of fortune. These took the road towards Constantinople, through Hungary and Bulgaria; and, trusting that heaven, by supernatural assistance, would supply

Croisade.

Croisade. supply all their necessities, they made no provision for subsistence on their march. They soon found themselves obliged to obtain by plunder what they vainly expected from miracles; and the enraged inhabitants of the countries through which they passed, attacked the disorderly multitude, and slaughtered them without resistance. The more disciplined armies followed after; and, passing the straits at Constantinople, they were mustered in the plains of Asia, and amounted in the whole to 700,000 men.

This rage for conquering the Holy Land did not cease with this expedition. It continued for very near two centuries, and eight different croisades were set on foot, one after another. The first was in the year 1096, as already observed. The princes engaged in it were, Hugo, count of Vermandois, brother to Philip I. king of France; Robert, duke of Normandy; Robert, earl of Flanders; Raimond, earl of Toulouse and St Giles; Godfrey of Bouillon, duke of Lorrain, with his brothers Baldwin and Eustace; Stephen, earl of Chartres and Blois; Hugo, count of St Paul; with a great number of other lords. The general rendezvous was at Constantinople. In this expedition, the famous Godfrey besieged and took the city of Nice. The city of Jerusalem was taken by the confederated army, and Godfrey chosen king. The Christians gained the famous battle of Ascalon against the sultan of Egypt; which put an end to the first croisade.

The second croisade, in the year 1144, was headed by the emperor Conrad III. and Lewis VII. king of France. The emperor's army was either destroyed by the enemy, or perished through the treachery of Manuel the Greek emperor; and the second army, through the unfaithfulness of the Christians of Syria, was forced to break up the siege of Damascus.

The third croisade, in the year 1188, immediately followed the taking of Jerusalem by Saladin the sultan of Egypt. The princes engaged in this expedition were, the emperor Frederic Barbarossa; Frederic, duke of Suabia, his second son; Leopold, duke of Austria; Berthold, duke of Moravia; Herman, marquis of Baden; the counts of Nassau, Thuringia, Misson, and Holland; and above 60 other princes of the empire; with the bishops of Befançon, Cambrai, Munster, Osnaburg, Misson, Passau, Wisburg, and several others. In this expedition, the emperor Frederic defeated the sultan of Iconium: his son Frederic, joined by Guy Lusignan, king of Jerusalem, in vain endeavoured to take Acre, or Ptolemais. During which transactions, Philip Augustus, king of France, and Richard II. king of England, joined the croisade; by which means the Christian army consisted of 300,000 fighting men: but, great disputes happening between the kings of France and England, the former quitted the Holy Land, and Richard concluded a peace with Saladin.

The fourth croisade was undertaken, in the year 1195, by the emperor Henry VI. after Saladin's death. In this expedition, the Christians gained several battles against the infidels, took a great many towns, and were in the way of success, when the death of the emperor obliged them to quit the Holy Land, and return into Germany.

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The fifth croisade was published, by order of Pope Innocent III. in 1198. Those engaged in it made fruitless efforts for the recovery of the Holy Land: for, though John de Neule, who commanded the fleet equipped in Flanders, arrived at Ptolemais a little after Simon of Montfort, Renard of Dampierre, and others; yet the plague destroying many of them, and the rest either returning, or engaging in the petty quarrels of the Christian princes, there was nothing done; so that the sultan of Aleppo easily defeated their troops in 1204.

The sixth croisade began in 1228; in which the Christians took the town of Damietta, but were forced to surrender it again. The next year, the emperor Frederic made peace with the sultan for 10 years. About 1240, Richard, earl of Cornwall, and brother to Henry III. king of England, arrived in Palestine, at the head of the English croisade; but, finding it most advantageous to conclude a peace, he embarked, and steered towards Italy. In 1244, the Karafmians being driven out of Perlia by the Tartars, broke into Palestine, and gave the Christians a general defeat near Gaza.

The seventh croisade was headed by St Lewis, in the year 1249, who took the town of Damietta: but a sickness happening in the Christian army, the king endeavoured a retreat; in which being pursued by the infidels, most of his army were miserably butchered, and himself and the nobility taken prisoners. Then a truce was agreed upon for 10 years, and the king and lords set at liberty.

The eight croisade, in 1270, was headed by the same prince, who made himself master of the port and castle of Carthage, in Africa; but, dying in a short time, he left his army in a very ill condition. Soon after, the king of Sicily coming up with a good fleet, and joining Philip the bold, son and successor of Lewis the king of Tunis, after several engagements with the Christians, in which he was always worsted, desired peace, which was granted upon conditions advantageous to the Christians: after which, both princes embarked for their own kingdoms. Prince Edward of England, who arrived at Tunis at the time of this treaty, sailed towards Ptolemais, where he landed with a small body of 300 English and French, and hindered Bendocdar from laying siege to Ptolemais: but, being obliged to quit the Holy Land to take possession of the crown of England, this croisade ended, without contributing any thing to the recovery of the Holy Land. In 1291, the town of Acre, or Ptolemais, was taken and plundered by the sultan of Egypt, and the Christians quite driven out of Syria. There has been no croisade since that time, though several popes have attempted to stir up the Christians to such an undertaking; particularly Nicholas IV. in 1292, and Clement V. in 1311.

Though these croisades were effects of the most absurd superstition, they tended greatly to promote the good of Europe. Multitudes indeed were destroyed. M. Voltaire computes the people who perished in the different expeditions at upwards of two millions. Many there were, however, who returned; and these, having conversed so long with people who lived in a much more magnificent way than themselves, began to entertain some taste for a refined and polished way

Croifade of life. Thus the barbarism in which Europe had been so long immerfed, began to wear off foon after this time. The princes alfo who remained at home, found means to avail themfelves of the frenzy of the people. By the abfence of fuch numbers of refflefs and martial adventurers, peace was eftablifhed in their dominions. They alfo took the opportunity of annexing to their crown many confiderable fiefs, either by purchafe, or by the extinction of the heirs; and thus the mifchiefs which muft always attend feudal governments were confiderably leffened.

With regard to the bad fucceds of the croifaders, it was fcarce poffible that any other thing could happen them. The emperors of Conftantinople, inftead of affifting, did all in their power to difconcert their fchemes. They were jealous, and not without reafon, of fuch an inundation of barbarians. Yet, had they confidered their true intereft, they would rather have affifted them, or at leaft flood neuter, than entered into alliances with the Turks. They followed the latter method, however, and were often of very great difervice to the weftern adventurers, which at laft occafioned the lofs of their city *. But the worft enemies the croifaders had, were their own internal feuds and diffentions. They neither could agree while marching together in armies with a view to conqueft, nor could they unite their conquefts under one government after they had made them. They fet up three fmall ftates, one at Jerufalem, another at Antioch, and another at Edeffa. Thefe ftates, inftead of affifting, made war upon each other, and on the Greek emperors; and thus became an eafy prey to the common enemy. The horrid cruelties they committed alfo were fuch as muft have infpired the Turks with the moft invincible hatred againft them, and made them refift with the greateft obftinacy. They were fuch as could have been committed only by barbarians inflamed with religious enthufiafm. When Jerufalem was taken, not only the numerous garrifon were put to the fword, but the inhabitants were maffaced without mercy, and without diftinction. No age nor fex was fpared, not even fucking children. According to Voltaire, fome Chriftians, who had been fuffered by the Turks to live in that city, led the conquerors into the moft private caves where women had concealed themfelves with their children, and not one of them was fuffered to efcape. What eminently fhews the enthufiafm by which thefe conquerors were animated, is their behaviour after this terrible flaughter. They marched over heaps of dead bodies towards the holy fepulchre; and while their hands were yet polluted with the blood of fo many innocent perfons, fang anthems to the common Saviour of mankind. Nay, fo far did their religious enthufiafm overcome their fury, that thefe ferocious conquerors now burft into tears. If the abfurdity and wickednefs of this conduct can be exceeded by any thing, it muft be by what follows. In the year 1204, the frenzy of croifading feized the children, who are ever ready to imitate what they fee their parents engage themfelves in. Their childifh folly was encouraged by the monks and fchoolmafters; and thoufands of thofe innocents were conducted from the houfes of their parents on the faith of thefe words, "Out of the mouth of babes and fucklings haft thou

perfected praife." Their bafe conductors fold a part of them to the Turks, and the reft perifhed miferably.

CROISES, or **CROIZES**, in English antiquity, pilgrims bound for the Holy Land, or fuch as had been there; fo called from a badge they wore in imitation of a crofs. The knights of St John of Jerufalem, created for the defence and protection of pilgrims, were particularly called *croifes*.

CROISIERS, a religious order founded in honour of the invention or difcovery of the crofs by the empress Helena. They are difperfed in feveral parts of Europe, particularly in the Low Countries, France, and Bohemia, thofe in Italy being at prefent fuppreffed. Thefe religious follow the rule of St Auguftine. They had in England the name of *crouched friers*.

CROMARTY, the capital of the fhire of Cromarty, in Scotland, with an excellent and fafe harbour capable of containing the greateft fleets. W. Long. 3. 40. N. Lat. 57. 54.

CROMWELL (Thomas), earl of Effex, was the fon of a blackfmith at Putney, and born in 1498. Without a liberal education, but endowed with a ftrong natural genius, he confidered travelling as the proper means of improving his underftanding; and to this early token of his found judgement he flood indebted for the high rank and diftinguifhed honours he afterwards enjoyed. He became by degrees the confidential favourite, and prime minifter of Henry VIII.; and from the moment he acquired any authority in the cabinet, he employed it in promoting the reformation, to his zeal for which he became a victim; for, the more firmly to fecure the proteftant caufe, he contrived to marry the king to Ann of Cleves, whose friends were all Lutherans. Unfortunately Henry took a difguft to this lady, which brought on Cromwell's ruin; the king, with his ufual cruelty and caprice, taking this opportunity to facifice this minifter to the Roman Catholic party, to whom he feemed defirous of reconciling himfelf as foon as he had Catharine Howard in view. Cromwell was a great politician, and a good man; but, like moft ftatefmen, was guilty of great errors. In his zeal for the new religion, he had introduced the unjuftifiable mode of attainting in cafes of treafon and herefy; and his enemies, who were numerous, (confifting of two claffes, the ancient nobility and gentry, who were enraged to fee the higheft honours beftowed on a man of his mean extraction, and the Roman Catholics, who detefted him), having preferred many complaints againft him, availed themfelves of his own law. He was attainted of treafon and herefy, convicted unheard, and beheaded in 1540. He was the chief instrument of the fuppreffion of the abbeyes and monafteries, and of the deftruction of images and relics; to him alfo we are indebted for the institution of parifh-regifters of births, marriages, and burials.

CROMWELL (Oliver), ftyled *Lord Protector* of the commonwealth of England, one of the moft extraordinary perfonages mentioned in hiftory, was the fon of Mr Robert Cromwell of Hinchinbrooke in the county of Huntingdon. His anceftors were of very honourable extraction; but no ways related to Thomas Cromwell earl of Effex, the prime minifter and favourite

* See Conftantinople, n^o 149.

Cromwell.

favourite of Henry VIII. He was born in the parish of St John, Huntingdon, where his father mostly lived, on the 24th or 25th of April 1599, and educated at the free school of that town. Little is known concerning him in his younger years, or indeed concerning his behaviour in private life. It is, however, related by authors of unqualified veracity, that when at school he gave many signs of a very turbulent and restless disposition. He is also said from his early years to have been subject to the hypochondriac disorder, and to many deceptions of the imagination. He had a very remarkable one while at school. It happened in the day time, when he was lying melancholy upon his back in bed. A spectre, as he thought, approached him, and told him that he should be the greatest man in the kingdom. His father, being informed of this, was very angry, and desired his master to correct him severely. This, however, produced no effect. Oliver persisted in the truth of his story, and would sometimes mention it though his uncle told him "it was too traitorous to be repeated."—From this school, Oliver was removed to Sidney-college in Cambridge, where he was admitted in 1616. His progress in his studies is uncertain; but he spent much time in playing at foot-ball, cricket, and other robust exercises, at which he was very expert. His father dying after he had been about two years at college, Cromwell returned home; but the irregularity of his life gave such offence to his mother, that, by the advice of some friends, she sent him to London, and placed him in Lincoln's-inn. This expedient by no means answered the purpose; for he gave himself up to gaming, wine, and women, so that he quickly dissipated all that was left him by his father. This dissipation, however, could be but of very short continuance; for he was married, before he was 21 years of age, to Elizabeth, daughter of Sir James Bouchier of Essex. Soon after his marriage he returned to the country, where he led a very grave and sober life. This sudden reformation has been ascribed to his falling in with the Puritans; but it is certain, that Mr Cromwell continued then, and for some time after, a zealous member of the church of England, and formed a close friendship with several eminent divines. He continued at Huntingdon where he settled after his marriage, till an estate of between L. 400 and L. 500 *per annum* devolved to him by the death of his uncle Sir Thomas Stuart. This induced him to remove to the Isle of Ely where the estate lay, and here he embraced the puritanical doctrines. He was elected a member of the third parliament of Charles I. which met on the 20th of January 1628; and was a member of the committee for religion, where he distinguished himself by his zeal against popery. After the dissolution of that parliament, he returned again into the country, where he continued to express much concern for religion, to keep company with silenced ministers, and to invite them often to lectures and sermons at his house. Thus he brought his affairs again into a very indifferent situation; so that, by way of repairing the breaches he made in his fortune, he took a farm at St Ives, which he kept five years. But this scheme succeeded so ill, that he was obliged to give it up; and at last, chagrined with his disappointments,

and made uneasy by the treatment his party at that time received, he formed a design of going over to New-England. In this, however, he was disappointed; the king issued out a proclamation against all such emigrations, and Cromwell was obliged to remain in England against his will.

In 1638, Cromwell had first an opportunity of getting himself publicly taken notice of. The earl of Bedford, and some other persons of high rank, who had estates in the fen country, were very desirous of having it better drained; and, though one project of this sort had failed, they set on foot another, got it countenanced by royal authority, and settled a part of the profits upon the crown. This, though really intended for a public benefit, was opposed as injurious to private property; and at the head of the opposers was Mr Oliver Cromwell, who had considerable influence in these parts. The vigour he shewed on this occasion recommended him to his friend and relation Mr Hampden; who afterwards characterized him in parliament, as a person capable of contriving and conducting great designs. But for all this he was not very successful in his opposition; and as his private affairs were still declining, he was in very necessitous circumstances at the approach of the long parliament. In this critical situation he got himself elected member of parliament in the following manner. In the puritanical meetings which he constantly frequented, Oliver had most eminently distinguished himself by his gifts of praying, preaching, and expounding. At one of these meetings, he met with one Richard Tims a tradesman of Cambridge. This man was so much taken with Oliver, that he took it into his head to attempt getting him chosen burgess for the approaching parliament. Being himself one of the common council, Tims imagined this design might be brought about; and with this view went to Mr Wildbore a relation of Cromwell's, to whom he communicated his intention. Wildbore agreed as to the fitness of the person; but told him the design was impracticable, because Oliver was not a freeman. Tims next addressed one Evert on the same subject, who also made the same objection. He recollected, however, that the mayor had a freedom to bestow, and a scheme was immediately laid for securing this freedom to Cromwell. On application to the mayor, however, he told them that the freedom was already disposed of to another; but this objection being obviated by promising that person a freedom from the town, the mayor, being informed that Cromwell was a man of great fortune, signified his intention of bestowing the freedom upon him. Our hero, being informed of the good offices of his friends, made his appearance in the court dressed in scarlet richly laced with gold, and having provided plenty of claret and sweetmeats, they were so freely circulated among the corporation, that Mr Mayor's freeman was unanimously declared to be a very civil worthy gentleman. When the election came on, the mayor discovered his mistake, but it was now too late; the party among the burgesses was strong enough to choose him, and accordingly did so at the election next year.

When Cromwell first came into parliament, he affected great plainness, and even carelessness, in his dress. His attention to farming had entirely rusticated him,

Cromwell. so that he made a very uncouth appearance. "Who (says Dr South) that had beheld such a bankrupt, beggarly fellow, as Cromwell, first entering the parliament house, with a thread-bare torn coat and greasy hat, and perhaps neither of them paid for, could have suspected, that, in the space of so few years, he should, by the murder of one king, and the banishment of another, ascend the throne, be invested with the royal robes, and want nothing of the state of a king but the changing his hat into a crown?" Cromwell was very active in promoting the famous *Remonstrance**, which in reality laid the foundation of the civil war. He declared afterwards to lord Falkland, that if the remonstrance had not been carried, he designed to have converted the small remains of his estate into ready money the next day, and to have left the kingdom by the first opportunity. His firmness on this occasion so effectually recommended him to Hampden, Pym, and the other leaders of the popular party, that they took him into all their councils; and here he acquired that clear insight into things, and that knowledge of men, of which he afterwards made such prodigious use. His exploits during the civil war, his murder of the king, and usurpation of the kingdom, are related under the article *BRITAIN*, n° 139.—188.

With regard to the character of Cromwell, Mr Hume expresses himself as follows: "The writers attached to this wonderful person make his character, with regard to abilities, bear the air of the most extravagant panegyric: his enemies form such a representation of his moral qualities as resembles the most virulent invective. Both of them, it must be confessed, are supported by such striking circumstances in his fortune and conduct, as bestow on their representation a great air of probability. 'What can be more extraordinary, it is said, than that a person of private birth and education, no fortune, no eminent qualities of body, which have sometimes, nor shining qualities of mind, which have often raised men to the highest dignities, should have the courage to attempt, and the abilities to execute, so great a design as the subverting one of the most ancient as well as best established monarchies in the world? That he should have the power and boldness to put his prince and master to an open and infamous death? Should banish that numerous and strongly allied family? Cover all these temerities under a seeming obedience to a parliament, in whose service he pretended to be retained? Trample too upon that parliament in their turn, and scornfully expel them as soon as they gave him ground of dissatisfaction? Erect in their place the dominion of the faints, and give reality to the most visionary idea which the heated imagination of any fanatic was ever able to entertain? Suppress again that monster in its infancy, and openly set himself up above all things that ever were called *sovereign* in England? Overcome first all his enemies by arms, and all his friends afterwards by artifice? Serve all parties patiently for a while, and afterwards command them victoriously at last? Over-run each corner of the three nations, and subdue with equal facility both the riches of the south, and the poverty of the north? Be feared and courted by all princes, and adopted a brother to the gods of the earth? Call together parliaments with a

word of his pen, and scatter them again by the breath of his mouth? Reduce to subjection a warlike and discontented nation by means of a mutinous army? Command a mutinous army by means of feditious and faction officers? Be humbly and daily petitioned, that he would be pleased, at the rate of millions a year, to be hired as master of those who had formerly hired him for their servant? Have the estates and lives of three nations as much at his disposal as was once the little inheritance of his father, and be as noble and liberal in the spending of them? And lastly, (for there is no end of enumerating every particular of his glory), with one word bequeath all this power and splendor to his posterity? Die possessed of peace at home, and triumph abroad? Be buried among kings, and with more than regal solemnity? And leave a name behind him not to be extinguished but with the whole world; which, as it was too little for his praise, so it might have been for his conquests, if the short line of his mortal life could have stretched out to the extent of his immortal designs?"

"My intention is not to disfigure this picture drawn by so masterly a hand: I shall only endeavour to remove from it somewhat of the marvellous, a circumstance which, on all occasions, gives much ground for doubt and suspicion. It seems to me that the circumstance of Cromwell's life in which his abilities are principally discovered, is his rising, from a private station, in opposition to so many rivals, so much advanced before him, to a high command and authority in the army. His great courage, his signal military talents, his eminent dexterity and address, were all requisite for this important acquisition. Yet will not this promotion appear the effect of supernatural abilities, when we consider that Fairfax himself, a private gentleman, who had not the advantage of a seat in parliament, had, through the same steps, attained even to a superior rank, and, if endued with common capacity and penetration, had been able to retain it. To incite such an army to rebellion against the parliament, required no uncommon art or industry: to have kept them in obedience, had been the more difficult enterprize. When the breach was once formed between the military and civil powers, a supreme and absolute authority, from that moment, is devolved on the general; and if he is afterwards pleased to employ artifice or policy, it may be regarded on most occasions as great condescension, if not as superfluous caution. That Cromwell was ever able really to blind, or over-reach, either the king or the republicans, does not appear: as they possessed no means of resisting the force under his command, they were glad to temporize with him, and, by seeming to be deceived, to wait for an opportunity of freeing themselves from his dominion. If he seduced the military fanatics, it is to be considered, that their interest and his evidently concurred; that their ignorance and low education exposed them to the grossest imposition; and that he himself was at bottom as frangible an enthusiast as the worst of them, and, in order to obtain their confidence, needed but to display those vulgar and ridiculous habits which he had early acquired, and on which he set so high a value. An army is so forcible, and at the same time so coarse a weapon,

that

* See
Britain,
n° 107.

Cromwell. that any hand which yields it, may, without much dexterity, perform any operation, and attain any ascendancy in human society.

"The domestic administration of Cromwell, though it discovers great ability, was conducted without any plan either of liberty or arbitrary power: perhaps his peculiar situation admitted of neither. His foreign enterprises, though full of intrepidity, were pernicious to national interest; and seem more the result of impetuous fury or narrow prejudices, than of cool foresight and deliberation. An eminent personage, however, he was in many respects, and even a superior genius; but unequal and irregular in his operations: and, though not defective in any talent except that of elocution, the abilities which in him were most admirable, and which contributed most to his marvellous success, were the magnanimous resolution of his enterprises, and his peculiar dexterity in discovering the characters and practising on the weaknesses of mankind.

"If we survey the moral character of Cromwell, with that indulgence which is due to the blindness and infirmities of the human species, we shall not be inclined to load his memory with such violent reproaches as those which his enemies usually throw upon it. Amidst the passions and prejudices of that time, that he should prefer the parliamentary to the royal cause, will not appear extraordinary; since, even at present, many men of sense and knowledge are disposed to think, that the question, with regard to the justice of the quarrel, may be regarded as doubtful and ambiguous. The murder of the king, the most atrocious of all his actions, was to him covered under a mighty cloud of republican and fanatical illusions; and it is not impossible but he might believe it, as many others did, the most meritorious action which he could perform. His subsequent usurpation was the effect of necessity, as well as of ambition; nor is it easy to see how the various factions could at that time have been restrained without a mixture of military and arbitrary authority. The private deportment of Cromwell as a son, a husband, a father, a friend, is exposed to no considerable censure, if it does not rather merit praise. And, upon the whole, his character does not appear more extraordinary and unusual by the mixture of so much absurdity with so much penetration, than by his tempering such violent ambition and such enraged fanaticism with so much regard to justice and humanity."

That Cromwell continued a most complete and bigotted enthusiast to the very last, appears from his behaviour in his last sickness. His disease, which at first was a kind of slow fever, brought on by the cares and anxiety of his mind, soon degenerated into a tertian ague. For about a week the disorder continued without any dangerous symptoms, inasmuch that every other day he walked abroad; but one day after dinner his five physicians coming to wait upon him, one of them having felt his pulse, said that it intermitted. At this Cromwell was surprized, turned pale, fell into a cold sweat, and, when he was almost fainting, ordered himself to be carried to bed; where, by the assistance of cordials, being brought a little to himself, he made his will with respect to his private affairs. The next morning when one of his physicians came to visit

Cromwell. him, Cromwell asked him, why he looked so sad? and when answer was made, that so it became every one who had the weighty charge of his life and health upon him, "Ye physicians (says Cromwell), think I shall die: I tell you I shall not die this bout, I am sure of it. Do not you think, (said he to the physician, looking more attentively at him), do not think that I am mad: I speak the words of truth upon surer grounds than your Hippocrates or Galen can furnish you with. God Almighty himself hath given that answer, not to my prayers alone, but also to the prayers of those who entertain a stricter commerce and greater interest with him. Go on cheerfully, banishing all sadness from your looks; and deal with me as you would do with a serving man. Ye may have a skill in the nature of things; yet nature can do more than all physicians put together, and God is far more above nature." As this physician was coming out of the chamber, he accidentally met with another, to whom he expressed his fear that the protector was turning light-headed. But the other informed him that the chaplains, being dispersed the preceding night into different parts of the house, had prayed for the protector's recovery, and unanimously received for answer that he should recover. Nay, to such a degree of madness did they at last arrive, that, a public fast being kept at Hampton-court, they did not so much pray to God for the protector's health, as return thanks for the undoubted pledges they had of his recovery. On this account, though the physicians perceived his distemper increasing every hour, they took no notice of his danger, till it became necessary for him to appoint a successor while he had any breath remaining. But being then in a lethargic fit, he answered from the purpose; upon which he was again asked whether he did not name his eldest son Richard? and to this question he answered, Yes. Being then asked where his will was which he had formerly made concerning the heirs of the kingdom; he sent to look for it in his closet and other places, but in vain; for somebody had either stole it, or he himself had burnt it. Soon after, he expired, on the 3^d of September 1658, aged somewhat more than 59 years and four months. This day of September he had always reckoned to be the most fortunate for him in the whole year. A violent tempest, which immediately succeeded his death, served as a subject of discourse to the vulgar. His partizans, as well as his opponents, were fond of remarking this event; and each of them endeavoured, by forced inferences, to interpret it as best suited their particular prejudices.

It has been imagined by some, that Oliver Cromwell was poisoned; but for this there seems to be no reasonable foundation. His body was opened by Dr Bates. He found the brain somewhat overcharged with blood, and the lungs a little inflamed; but what he reckoned to have been the principal cause of his disorder was a total degeneracy of the substance of the spleen into a matter resembling the lees of oil. This, he thought, also accounted for the hypochondriac dispositions to which Cromwell had from his infancy been subject. Though the bowels were taken out, and the body filled with spices, wrapped in a fourfold cere-cloth, put first into a coffin of lead, and then into one of wood, yet the corruption was so great that the

humour

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burg.

humour wrought itself through the whole, and there was a necessity of interring the body before the solemnity of the funeral. A very pompous funeral was ordered at the public expence, and performed from Somerset-house, with a splendour not only equal but superior to that bestowed upon crowned heads. Some have related that his body was deposited in Naseby field; others, that it was wrapped in lead, and sunk in the deepest part of the Thames, to prevent any insult that might afterwards be offered to it. But it seems beyond doubt that his body was interred at Westminster, as we are informed, that on the order to disinter him after the restoration, his corpse was found in a vault in the middle aisle of Henry VIIIth's chapel. In the inside of the coffin, and on the breast of the corpse was laid a copper plate finely gilt, inclosed in a thin case of lead: on one side of this plate were engraven the arms of England impaled with those of Oliver; and, on the reverse, the following legend: "*Oliverius Protector Reipublice Angliae, Scotiae, et Hiberniae, natus 25 Aprilis 1599, inauguratus 16 Decembris 1653, mortuus 3 Septembris anni. 1658, hic situs est.*"

Cromwell was of a robust frame of body, and of a manly, though not agreeable aspect. His nose being remarkably red and thinning, was often made the subject of ridicule. He left only two sons, Richard and Henry: and three daughters; one married to general Fleetwood, another to lord Fauconberg, and a third to lord Rich. His mother lived till after he was protector; and contrary to her orders he buried her with great pomp in Westminster Abbey. She could not be persuaded that ever his power or his person was in safety. At every noise she heard she would exclaim that her son was murdered; and was never satisfied that he was alive, if he did not receive frequent visits from him. She was a decent woman; and by her frugality and industry had raised and educated a numerous family upon a small fortune. She had even been obliged to set up a brewery at Huntingdon, which she managed to good advantage. Hence Cromwell, in the invectives of that age, is often stigmatized with the name of brewer. Ludlow, by way of insult, mentions the great accession which he would receive to his royal revenues upon his mother's death, who possessed a jointure of 60 pounds a year upon his estate. She was of a good family, of the name of Stuart; and is by some supposed to have been remotely allied to the royal family.

CROMWELL (Richard), eldest son of Oliver Cromwell, was by his father appointed successor to the protectorship, but very soon deposed by the army*. They discharged his debts, took all the household stuff, plate, &c. gave him a protection for six months, and so he retired. He was by no means qualified to support the station gained by the aspiring talents of his father; he was of a moderate temper, and untainted with that fanatical spirit which his father had so successfully cultivated: on the restoration he went abroad; but returned 1680 under the assumed name of Clark, and settled at Cheshunt in Hertfordshire, where he lived privately, and died in 1712, aged 86.

CRONENBURG, a town of Germany, in the circle of the upper Rhine, and in the landgrate of Hesse Cassel, with a strong castle. It is seated at the foot of

a high mountain, on a fertile soil, and is surrounded with a double wall. E. Long. 8. 15. N. Lat. 50. 15.

CRONENBURG, a strong fortress of Denmark, in the isle of Zealand, at the entrance of the sound, where the Danes take toll of such ships as are bound for the Baltic. It was very richly furnished, but pillaged by the Swedes in 1658, who took away the furniture, among which were some statues of massy silver. It is built upon piles. E. Long. 12. 50. N. Lat. 56. 0.

CRONSLOT, a town and fortress of Russia, in a little island of the same name, situated in the mouth of the river Neva, near the entrance of the gulph of Finland. It has a good harbour, which is the station of the Russian fleet, and where the great magazines of naval stores as well as docks and yards for building ships are. E. Long. 32. 0. N. Lat. 60.

CRONSTAT, a town of Transylvania, near the frontiers of Moldavia, subject to the house of Austria. E. Long. 25. 0. N. Lat. 47. 0.

CROP, the highest part or end of any thing cut off. It is particularly used for the corn gathered off a field in harvest. See AGRICULTURE, Part II. Sect. ii. v. vi.

CROSIER, or CROZIER, a shepherd's crook; a symbol of pastoral authority, consisting of a gold or silver staff, crooked at the top, carried occasionally before bishops and abbots, and held in the hand when they give the solemn benedictions. The custom of bearing a pastoral staff before bishops is very ancient. Regular abbots are allowed to officiate with a mitre and crozier. Among the Greeks none but a patriarch had a right to the crozier.

CROSIER, in astronomy, four stars in the southern hemisphere, in the form of a cross, serving those who sail in fourth latitudes to find the antarctic pole.

CROSLET, in heraldry, is when a cross is crossed again at a small distance from each of the ends. Up-ton says it is not so often borne by itself in arms, as other crosses are, but often in diminutives, that is, in small crosses scattered about the field. See HERALDRY, n^o 26. examp. 10.

CROSS, in antiquity, a species of punishment, or rather the instrument wherewith it was inflicted, consisting of two pieces of wood crossing each other.

This punishment was only inflicted on malefactors and slaves, and thence called *servile supplicium*. The most usual method was to nail the criminal's hands and feet to this machine, in an erect posture; though there are instances of criminals so nailed with their head downwards.

Invention of the Cross, a festival observed on May 3^d, by the Latin church, in memory of the empress Helena's (the mother of Constantine) finding the true cross of Christ on mount Calvary, where he caused erect a church for the preservation of it.

Exaltation of the Cross, a grand festival solemnized on September 14th in commemoration of Heraclius's restoring to mount Calvary the true cross, that had been carried off by Cosroes king of Persia, upon taking the city of Jerusalem.

Order of the Cross, an order of ladies instituted in 1668, by the empress Eleonora de Gonzaga, wife of the emperor Leopold, on occasion of the miraculous recovery of a little golden cross, wherein were in-
ded

Cronen-
burg.
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Crofs.


* See Bri-
tain, n^o
190, 191.

Crofs.

fed two pieces of the true crofs, out of the afhes of a part of the palace that had been burnt down; though the fire burnt the cafe wherein it was inclofed, and melted the cryftal, it appeared that the wood had not received the leaft damage.

CROSS, in heraldry. See HERALDRY, n^o 25.

The crofs is a very ancient and honourable bearing; and is frequently to be met with in the coats of arms of thofe whole ancftors attended the warlike expeditions againft the Turks.

CROSS, in mining, two nicks cut on the fuperficies of the earth, thus , which the miners make when they take the ground to dig for ore. This crofs gives the miners three days liberty to make and to fet on ftones. As many of thefe croffes as the miner makes, fo many mears of ground he may have in the vein, provided he fet on ftones within three days after making his crofs or croffes. But if he make but one crofs, and a ftander-by makes the fecond, and a ftanger makes the third, every one is ferved with the next mear, according as they have firft or laft, fooner or later made their crofs, or croffes upon the ground.

CROSS, in coins, a name given to the right fide, or face; the other being called the *pile* or *reverse*. It has been a common error, that the reverse was meant by the crofs; becaufe at this time, with us, it is marked with figures difpofed in that form: but the ftamping the head of the prince in thefe kingdoms, on the right fide of the coin, was preceded by a general cuftom of ftriking on that part the figure of a crofs, while the other, called the *pile*, contained the arms, or fome other device.

CROSS-Bar Shot, a bullet with an iron bar paffing through it, and ftanding fix or eight inches out at both fides: it is ufed at fea, for deftroying the enemy's rigging.

CROSS-Jack, pronounced *cro-jack*, a fail extended on the lower yard of the mizen maff, which is hence called the *crofs-jack yard*. This fail, however, has generally been found of little fervice, and is therefore very feldom ufed.

CROSS-Piece, a rail of timber extended over the *windlafs* of a merchant-ship from the knight-heads to the beftrey. It is ftuck full of wooden pins, which are ufed to fatten the running rigging as occafion requires. See WINDLASS.

CROSS Trees, certain pieces of timber, fupported by the *cheeks* and *trelle-trees*, at the upper ends of the lower maffs, athwart which they are laid to fufftain the frame of the *top*.

CROSS-Bill, in ornithology. See LOXIA.

CROSS-Wort, in botany. See VALENTIA.

CROSS, an English artift, famous only for copying, in the reigns of Charles I. and Charles II. Of this talent there is a ftory current, more to the credit of his skill than of his probity. He is faid to have been employed by Charles I. to copy the celebrated Madona of Raphael in St Mark's church at Venice; and that, having obtained leave of the ftate for that purpofe, he executed his piece fo well as to bring away the original and leave his copy in the place of it. The deception was not detected until it was too late to recover the lofs; and this piece was bought in Oliver's time

by the Spanifh ambaffador for his mafter, who placed it in the efcorial.

CROSSEN, a handfome town of Silefia in Germany, and capital of a principality of the fame name. It is fituated at the confluence of the rivers Bobar and Oder, in a fertile country abounding in wine and fruits. There is a bridge over the Oder which is fortified. E. Long. 15. 20. N. Lat. 52. 5.

CROTALARIA, RATTLE-WORT; a genus of the decandria order, belonging to the diadelphica clafs of plants. There are 11 fpecies, all of them natives of warm climates. They rife from 18 inches to 5 feet in height, and are adorned with flowers of a blue or yellow colour. The moft remarkable fpecies is the *retufa* with fimple oblong wedged leaves. It is a native of the ifland of Ceylon, and fome other parts of the Eaft Indies. The flowers are yellow, the pods fmooth, cylindrical, inflated, and placed horizontally: they are filled with feeds, which, when dried, and fhaken by the lighteft wind, emit a rattling noife: and this, by the rude inhabitants of the countries where the plant is native, is attributed to the devil, who is thought to deliver his oracles in this whimfical manner.

CROTALUS, or RATTLE-SNAKE, in zoology, a genus belonging to the order of amphibia serpentes; the characters of which are thefe: The belly is furnifhed with fcuta, and the tail has both fcuta and fcales; but the principal characteristic of this genus, is the rattle at the end of the tail. The rattles confift of feveral articulated cruftaceous, or rather horny, bags, which make a confiderable rattling noife when the creature moves, and ferves to warn people of their approach. There are five fpecies; and the bite of every one of them is fo highly poisonous, that it generally kills in a fhort time. Of thefe we have no account that can be depended upon, except that given by Mr Catefby of the horridus, or American rattle-fnake. This grows fometimes to the length of 8 feet, and weighs between 8 and 9 pounds. The colour of the head is brown; the eye red; the upper part of the body of a yellowifh-brown colour, tranfverfely marked with irregular broad black lifts. The rattle is of a brown colour, compofed of feveral horny, membranous, cells, of an undulated pyramidal figure. Thefe are articulated within one another in fuch a manner that the point of the firft cell reaches as far as the bafis of the protuberant ring of the third, and fo on; which articulation, being very loofe, gives liberty to the parts of the cells that are inclofed within the outward rings to ftrike againft the fides of them, and fo to caufe the rattling noife which is heard when the fnake fhakes its tail. This is the moft inactive and flow moving of all the fnakes, and is never the aggreffor except in what it preys upon. The above gentleman is of opinion that no remedy is yet difcovered for the bite of this animal. He had frequently accels to fee Indians bit by it, and always thought that thofe who recovered were cured more through the force of nature, or by reafon of the lightnefs of the bite, than by the remedies ufed. He tells us, that the Indians know their deftiny the moment they are bit; and if the bite happens to be on any of the large veins, they apply no remedies, as knowing them to be entirely ufelefs.

Croffen
Crotalus.

Crochet
|
Crotona.

Crotoy
|
Crow.

lefs. He believes the reports of the fascinating power of this serpent, though he never had an opportunity of seeing it. See Plate LXXXIV. fig. 10.

CROCHET, in music, one of the notes or characters of time, marked thus ♩ , equal to half a minim, and double of a quaver.

CROCHETS are also marks or characters, serving to inclose a word or sentence which is distinguished from the rest, being generally in this form [].

CROTON, **WILD RIGINS**; a genus of the polyandria order, belonging to the monœcia class of plants. There are 21 species; the only remarkable one of which is the tinctorium, or plant from which the French turnsole is made. This grows naturally in the south of France: it is an annual plant, rising about 9 inches high, with an herbaceous branching stalk, garnished with irregular or rhomboidal figured leaves, which are near two inches long, and an inch and a quarter wide in their widest part. These stand upon slender foot-stalks near four inches long. The flowers are produced in short spikes from the sides of the stalks, at the end of the branches; the upper part of the spike is composed of male flowers, having many stamina which coalesce at the bottom; the lower part hath female flowers, which have each a roundish, three-cornered, germen; these afterwards become a roundish capsule with three lobes, having three cells, each including one roundish seed. This flowers in July; but unless the plants are brought forward on a hot-bed, they do not ripen seeds in this country. The seeds of this plant should be sown in the autumn soon after they are ripe, in a small pot filled with light earth, and plunged into an old tan-bed in a frame, where they may be screened from cold in the winter; and in the spring following the pot should be removed to a fresh hot-bed, where the plants will come up in a month's time. When they are grown large enough to be removed, they are then to be planted each in a small pot, and plunged into a fresh hot-bed, being careful to shade the glasses daily, until the plants have taken new root: then they should have air daily admitted according to the warmth of the season, and but little water given them. By this method only they can be brought to flower well, and produce good seeds in this country.

From this plant is made the turnsole used for colouring wines and jellies. It is made of the juice which is lodged between the empalement and the seeds; which, if rubbed on cloths, at first appears of a lively green, but afterwards changes to a bluish purple colour. If these cloths are put into water, and afterwards wrung, they will dye the water to a claret colour. The rags thus dyed are brought to this country, and sold in the druggists's shops under the name of *turnsole*.

The other species of croton are natives of warmer climates. From one of them, called the *physic-nut tree*, is obtained a milky juice, said to be applied to green wounds with success. The nut, when ripe, yields a considerable quantity of oil, a spoonful of which swallowed when fresh is of a purgative quality, and is proper for abating dropical swellings.

CROTONA, a town of Italy, in the kingdom of Naples, seated on the gulph of Taranto, with a bishop's

see and a citadel. E. Long. 17. 27. N. Lat. 39. 10.

CROTOY, a town of France, in Picardy, and in Ponthieu. The fortifications are demolished. It is seated at the mouth of the river Somme. E. Long. 1. 45. N. Lat. 50. 15.

CROUCHED FRIARS. See **CROISIERS**.

CROUP, in medicine. See (the *Index* subjoined to) that article.

CROUP of a *Horse*, in the menage, the extremity of the reins above the hips.

CROUPADE, in the menage, a leap, in which the horse pulls up his hind legs, as if he drew them up to his belly.

CROUZAS (John Peter de), a learned philosopher and mathematician, was born in 1663: having made great progress in the mathematics and the philosophy of Des Cartes, he travelled to Geneva, Holland, and France; was successively professor in several universities; and at length was chosen governor to prince Frederic of Hesse-Cassel, nephew to the king of Sweden. He wrote many works, the most esteemed of which are, 1. His *Logic*, the best edition of which is that of 1741, in 6 vols 8vo; 2. A *Treatise on Beauty*; 3. A *Treatise on the Education of Children*, 2 vols 12mo; 4. Several *Treatises on Philosophical and Mathematical Subjects*, &c. He died at Lausanne in 1748.

CROW, in ornithology. See **CORVUS**.

Crow, in mechanics, a kind of iron lever, with a claw at one end, and a sharp point at the other; used for heaving or purchasing great weights.

Crow's Bill, among surgeons, a kind of forceps, for drawing bullets and other foreign bodies out of wounds.

Crow's Feet, in the military art, machines of iron, having four points, each about three or four inches long, so made, that whatever way they fall, there is still a point up: they are thrown upon breaches, or in passes where the enemy's cavalry are to march, proving very troublesome, by running into the horse's feet and laming them.

Crow-Foot, on ship-board, a complication of small cords spreading out from a long block, like the smaller parts which extend from the back-bone of a herring, (Plate LXXXII. fig. 12). It is used to suspend the *ownings*; or to keep the top-fails from striking violently, and fretting against the tops.

Crow-Net, is an invention for catching wild-fowl in the winter season, and may be used in the day-time. This net is made of double thread, or fine pack-thread; the meshes should be two inches wide, the length about ten yards, and the depth three; it must be verged on the side with good strong cord, and stretched out very stiff on long poles prepared for that purpose. When you are come to the place where you would spread your net, open it, and lay it out at its full length and breadth; then fasten the lower end of the net all along the ground, so as only to move it up and down; the upper end of the net must stand extended on the long cord; the further end thereof being staked first to the earth by a strong cord about five yards distant from the net. Place this cord in an even line with the lower edge of the net. The other end must be at least 25 yards distant to reach into some natural or artificial

artificial shelter, by the means of which you may lie concealed from the fowl, otherwise no good success can be expected. The net must be placed in such exact order that it may give way to play on the fowl on the least pull of the cord, which must be done smartly, lest the fowl should prove too quick for you. This net may be used for pigeons, crows, or other birds on corn-fields newly sown; as also in stubble-fields, provided the stubble conceals the net from the birds.

CROWD, in a general sense, signifies a number of people assembled in a place scarce big enough to hold them all.

To CROWD, in the sea-language, is to carry an extraordinary force of sail upon a ship, in order to accelerate her course on some important occasion; as in pursuit of, or flight from, an enemy; to escape any immediate danger, &c.

CROWLAND, a town in Lincolnshire, seated in the Fens, in a dirty soil, and had formerly an abbey of very great note. There is no coming at it but by narrow causeways, which will not admit a cart. It has three streets, separated from each other by water-courses, whose banks are supported by piles, and set with willow trees. Their chief trade is in fish and fowl, which are in great plenty in the adjacent pools and marshes. W. Long. 0. 10. N. Lat. 52. 40.

CROWN, an ornament worn on the head by kings, sovereign princes, and noblemen, as a mark of their dignity.

In scripture there is frequent mention of crowns, and the use of them seems to have been very common among the Hebrews. The high priest wore a crown, which was a fillet of gold placed upon the forehead, and tied with a ribbon of hyacinth colour, or azure blue. It seems also as if private priests, and even common Israelites, wore also a sort of crown, since God commands Ezekiel not to take off his crown, nor assume the marks of one in mourning. This crown was no more than a ribbon or fillet, with which the Jews and several people in the east girt their heads. And indeed the first crowns were no more than a bandelet drawn round the head, and tied behind, as we still see it represented on medals round the heads of Jupiter, the Ptolemies, and kings of Syria. Afterwards they consisted of two bandelets; by degrees they took branches of trees of divers kinds; at length they added flowers, inasmuch that Claudius Saturninus says, there was not any plant whereof crowns had not been made. The woods and groves were searched to find different crowns for the several deities; and they were used not only on the statues and images of the gods, by the priests in sacrificing, and by kings and emperors, but also on altars, temples, doors of houses, sacred vessels, victims, ships, &c.

The Roman emperors had four kinds of crowns, still seen on medals, viz. a crown of laurel, a radial or radiating crown, a crown adorned with pearls and precious stones, and the fourth a kind of bonnet or cap, something like the mortar.

The Romans had also various kinds of crowns, which they distributed as rewards of military achievements; as, 1. The oval crown, made of myrtle, and bestowed upon generals, who were intitled to the ho-

nours of the lesser triumph, called *ovation*. 2. The naval or rostral crown, composed of a circle of gold, with ornaments representing beaks of ships, and given to the captain who first grappled, or the soldier who first boarded an enemy's ship. 3. The crown called in Latin *vallis*, or *castrensis*, a circle of gold raised with jewels or palisades; the reward of him who first forced the enemy's entrenchments. 4. The mural crown, a circle of gold indented and embattled; given to him who first mounted the wall of a besieged place, and there lodged a standard. 5. The civic crown, made of the branch of a green oak, and given him who had saved the life of a citizen. 6. The triumphal crown, consisting at first of wreaths of laurel, but afterwards made of gold; proper to such generals as had the honour of a triumph. 7. The crown called *obdionalis*, or *graminea*, made of grass growing on the place; the reward of a general who had delivered a Roman army from a siege. 8. The racial crown, given to princes at their translation among the gods. We meet also with the corona aures, often bestowed on soldiers, without any other additional term; athletic crowns, and crowns of laurel, destined to crown victims at the public games, poets, orators, &c. All these crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour. See Plate LXXXII. fig. 15, 16, 17, 18, 19, 20, 21, 22. For an account of modern crowns, see HERALDRY, n^o 42.

CROWN is also used to signify the possessions and dignity of a king. The crown of England, according to Sir William Blackstone, is, by common law and constitutional custom, hereditary; and this in a manner peculiar to itself; but the right of inheritance may from time to time be changed or limited by act of parliament, under which limitations the crown still continues hereditary. See SUCCESSION.

Pleas of the CROWN. See PLEAS.

CROWN, in commerce, a general name for coins both foreign and domestic, which are of, or very near, the value of five shillings sterling.

CROWN-Office, an office belonging to the king's bench court, of which the king's coroner or attorney is commonly master. In this office, the attorney-general and clerk of the crown severally exhibit informations for crimes and misdemeanours at common law, as in the case of batteries, conspiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

CROWN-Glass, denotes the finest sort of window-glass. See GLASS.

CROWN-Scabs, in farriery. See there, § xxxvi. 2. CROWN-Wheel of a Watch, the upper wheel next the balance which by its motion drives the balance, and in royal pendulums is called the *swing-wheel*.

CROWN Imperial, in botany. See FRITILLARIA.

CROWNE (John), a celebrated dramatic writer, born in Nova Scotia, where his father was a minister. Being impatient of the gloomy restraint of that country, he came to England, where he was reduced to enter into the service of an old lady; of which he was soon as weary as he had been of America. He then had recourse to his pen, which quickly procured

Cruxal
I
Crucifix.

him favour at court; but this kind of subsistence proving precarious, he ventured to solicit Charles II. for some establishment. Charles promised to provide for him, but infisted first on having another comedy; and suggested to him the plan of a Spanish play, from which Crowne produced the comedy of *Sir Courtly Nice*: but the sudden death of the king on the last day of the rehearsal, plunged him at once from his pleasing expectations into disappointment and distress, and left him no resource but his wits. He died some time about the year 1703; and left behind him 17 tragedies and comedies, some of which are acted with great success. His chief excellency lay in comedy; yet his tragedies are far from being contemptible. His plots are for the most part his own invention; his characters are in general strongly coloured and highly finished; and his dialogue lively and spirited, attentively diversified, and well adapted to the several speakers. So that on the whole he may assuredly be allowed to stand at least in the third rank of our dramatic writers.

CROXAL (Samuel), an ingenious English divine, who in his youth wrote the celebrated poem intitled *The Fair Circassian*. He had the livings of Hampton in Middlesex; and the united parishes of St Mary Somerset, and St Mary Mounthaw, in London; both which he held till his death in 1751. He published many other poems and translations, with an entire English edition of *Esop's Fables*. In consequence of his attachment to Whig principles, he enjoyed some other preferments, and was chaplain in ordinary to George II.

CROYDON, a Town in Surry, in England. Its situation is low, near the spring-head of the river Wandel, and it is in a manner surrounded with hills. It is pretty large, and is chiefly noted for being the seat of the archbishop of Canterbury. It has a large handsome church, an hospital, and a free school. W. Long. o. 5. N. Lat. 51. 22.

CRUCIAL INCISION, in surgery, an incision made in the form of a cross.

CRUCIANELLA, **PETTY MADDER**; a genus of the monogynia order, belonging to the tetrandria class of plants. There are five species, natives of the southern parts of Europe, but none of them possessed of any remarkable quality.

CRUCIBLE, a chemical vessel made of earth, and so tempered and backed as to endure the greatest fire. They are used to melt metals, and to flux minerals, ores, &c. See **CHEMISTRY**, n° 86.

CRUCIFIX, a cross upon which the body of Christ is fastened in effigy, used by the Roman catholics to excite in their minds a strong idea of our Saviour's passion.

They esteem it an essential circumstance of the religious worship performed at the altar; and on Good Friday they perform the ceremony of adoring it, which is done in these words, *O crux ave, spes unica*; "Hail, thou cross, our only hope." The officiating priest uncovers the crucifix, elevates it with both his hands, and says, *Eccæ lignum crucis*; "Behold the wood of the cross." The people answer, *in quo salus mundi p. pendit*; "on which the Saviour of the world suffered death." Then the whole congregation bow

with great reverence, and devoutly kiss the holy wood.

CRUCIFIXION, a capital punishment by nailing the criminal to a cross. See **CROSS**.

CRUCIFORM, in general, something disposed cross-ways; but more especially used by botanists, for flowers consisting of four petals disposed in the form of a cross.

CRUDE, an epithet given to something that has not passed the fire, or had a proper degree of coction.

CRUDITY, among physicians, is applied to undigested substances in the stomach; to humours in the body which are unconcocted, and not prepared for expulsion; and to the excrements.

CRUISE, in the sea language, signifies to sail back and fore within a certain space of the sea, as well to annoy the enemy, as to protect our own trading vessels.

CRUISERS, in the navy, are small men of war made use of to and fro in the channel, and elsewhere, to secure our merchant ships and vessels from the enemy's small frigates and privateers. They are generally such as sail well, and are commonly well manned: and indeed the safety of the trade in the channel, and up and down the soundings, and other places, absolutely requires the constant keeping out such ships at sea.

CRUMENTATA, among zoologists, animals furnished with a pouch, or bag, wherein to receive their young in time of danger; as the opossum. See **DELPHIS**.

CRUOR, sometimes signifies the blood in general; sometimes only the venous blood; and sometimes extravasated or coagulated blood; but is most frequently used for the red globules of the blood, in contradistinction to the limpid or serous part.

CRUPPER, in the menage, the buttocks of a horse, the rump; also a thong of leather put under a horse's tail, and drawn up by thongs to the buckle behind the saddle, so as to keep him from casting the saddle forwards on his neck.

CRURÆUS, or **CRUREUS**, *Musculus*, in anatomy, a fleshy mass, covering almost all the fore-side of the os femoris, between the two vasti, which likewise cover the edges of this muscle on each side. See **ANATOMY**, *Table of the Muscles*.

CRURAL, in anatomy, an epithet given to the artery which conveys the blood to the crura or legs, and to the vein by which this blood returns towards the heart. See **ANATOMY**, n° 387. g.

CRUS, in anatomy, all that part of the body contained between the buttocks and the toes.

CRUSADO, in commerce, a Portuguese coin, struck under Alphonfus V. about the year 1457, at the time when pope Calixtus sent thither the bull for a crusade against the infidels. This coin has a cross on one side, and the arms of Portugal on the other.

CRUSCA, an Italian term signifying bran, is in use amongst us to denote that celebrated academy called *della Crusca*, established at Florence for purifying and perfecting the Tuscan language. See **ACADEMY**, N° 10. The academy took its name from its office, and the end propoed by it; which is, to refine the language,

Crucifixion
I
Crusca.

Crusta
|
Cruth.

language, and as it were to separate the bran from it. Accordingly, its device is a sieve; and its motto, *Il piu bel fior ne coglie*; that is, "It gathers the finest flour thereof." In the hall or apartment where the academy meets, M. Monconis informs us, that every thing bears an allusion to the name and device: the seats are in the form of a baker's basket; their backs like a shovel for moving of corn; the cushions of grey fatten, in form of sacks or wallets; and the branches where the lights are placed resembling sacks. The vocabulary *Della Crusca* is an excellent Italian dictionary, compiled by this academy.

CRUSTA LACTEA, in medicine, the same with ACHOR.

CRUSTACEOUS, an appellation given to animals covered with shells made up of several pieces, in contradistinction to those consisting of a single piece.

CRUTH, or CROWTH, a kind of musical instrument formerly in use among the common people in Wales. It is of the fiducial kind, somewhat resembling a violin, 22 inches in length, and an inch and an half in thickness. It has six strings supported by a bridge, and is played on with a bow: the bridge differs from that of a violin, in that it is flat and not convex on the top; a circumstance from which it is to be inferred, that the strings are to be struck at the same time, so as to afford a succession of concords. The bridge is not placed at right angles with the sides of the instrument, but in an oblique direction; and, which is further to be remarked, one of the feet of the bridge goes through one of the found-holes, which are circular, and rests on the inside of the back; the other foot, which is proportionably shorter, resting on the belly before the other found-hole. Of the strings, the four first are conducted from the bridge down the finger-board, as in a common violin; but the fifth and sixth, which are about an inch longer than the others, leave the small end of the neck about an inch to the right. The whole six are wound up either by wooden pegs in the form of the letter T, or by iron pins, which are turned with a wrest like those of a harp or spinnet. Of the tuning, it is to be remarked, that the fifth and sixth strings are the unison and octave of G; the fourth and fifth, the same of C; and the second and first, the same of D; so that the second pair of strings are a fourth, and the third a fifth to the first.

Concerning the antiquity of this instrument, there is but little written evidence to carry it further back than the time of Leland; nevertheless the opinion of its high antiquity is so strong among the inhabitants of the country where it was used, as to afford a probable ground of conjecture, that the cruth might be the prototype of the whole fiducial species of musical instruments. Another evidence of its antiquity, but which tends also to prove that it was not peculiar to Wales, arises from a discovery lately made and communicated to the society of antiquarians, respecting the abbey-church of Melrose in Scotland, supposed to have been built about the time of Edward II. It seems that among the outside ornaments of that church there is the representation of a *cruth*, very little different from the description above given. The instrument is now diffused, in so much that Sir John Hawkins, from whom

we extract, tells us, that there is but one person in the whole principality of North Wales that can play upon it; and as he was at that time near 60 years of age, the succession of performers is probably near an end.

CRUX, or St CROIX, one of the Caribbee islands, situated about 60 miles south-east of Porto-Rico, and subject to France. W. Long. 64. o. N. Lat. 17. 30.

CRYMODES, among physicians, a kind of fever attended with a shivering cold, and inflammation of the internal parts of the body.

CRYPTOGAMIA, (from *κρυπτος*, occultus, "concealed," and *γαμος*, nuptia, "nuptials"), the 24th class in the Linnæan system, comprehending those plants whose fructification is concealed either through minuteness, or within the fruit. See BOTANY, p. 1293, 1299; and the Scheme, p. 1292.

CRYPTOGRAPHY, the art of writing in cipher, or with sympathetic ink. See CIPHER and INK.

CRYSTAL, the name of a very large class of fossils; hard, pellucid, and naturally colourless; of regularly angular figures, composed of simple, not filamentous plates; not flexible nor elastic, giving fire with steel; not fermenting in acid menstrua, and calcining in a strong fire.

The orders of pure crystal are three; the first is perfect columnar crystals, with double pyramids, composed of 18 planes, in an hexangular column, terminated by an hexangular pyramid at each end: the second order is that of perfect crystals, with double pyramids, without a column, composed either of 12 or of 16 planes, in two hexangular pyramids, joined closely base to base, without the intervention of any column: the third order is that of imperfect crystals, with single pyramids, composed either of 12 or 10 planes, in an hexangular or pentangular column, affixed irregularly at one end to some solid body, and terminated at the other by an hexangular or pentangular pyramid.

These are all the general forms into which crystal, when pure, is found concentered: but under these there are almost infinite varieties in the number of angles, and the length, thickness, and other accidents of the columns and pyramids.

When crystal is blended with metalline particles at the time of its formation, it assumes a variety of figures wholly different from these, constituting a fourth order, under the name of *metalline crystals*: when that metal is lead, the crystal assumes the form of a cube; when it is tin, of a quadrilateral pyramid, with a broad base; when iron, the crystal is found concentered in rhomboidal figures: these crystals are very common about mines; but the common spars, which are liable to be influenced in the same manner by the metals, and to appear in the very same form, are to be carefully distinguished from them. There is one very easy test for this purpose, which is, that all spars are subject to be dissolved by aqua fortis, and effervesce violently only on its touching them: but it has no such effects on crystal.

The pebble-crystal is common enough in all parts of the world; but that which is formed of hexangular columns, affixed to a solid base at one end, and terminated by a hexangular column at the other, is infinitely

Crux
|
Crystal.

Crystal.

nately more so: this is what we call *sparg* or *rock crystal*, and is the species described by most authors under the name of *crystal of the shops*, or that kept for medicinal uses.

The origin and formation of crystals, as to the time and manner of them, deserve a very nice inquiry; since many of the more compound fossil bodies are formed chiefly either of crystal, or of spar, a body in many things resembling it. The original formation and coalescence of those bodies of which spar is the basis, we know may have been but of yesterday, since we have evident proofs that spar is concreting to this day, and that sparry bodies are forming every moment. This is evident from the sparry stalactites in the arches of modern buildings, particularly in one lately built as the new bridge at Westminster; the roofs of the arches of which were filled with these spars within a year after they were built. It is also demonstrable that the spars are not formed of matter exuding from the stone, since brick arches abound equally with them; and the brick vault which supports part of the grand terrace at London, was some time ago so full of them that there was not room to walk. These observations sufficiently demonstrate the growth of spar; but the vegetation of crystal remained dubious till Dr Hill shewed by some experiments that *crystal*, as well as spar, is dissolved in every kind of water, even such as appears to be most pure and clear. This is also probable from an observation of Neuman's, who tells us, that he has seen leaves, stalks of plants, hay, straw, hogs bristles, &c. inclosed in sprigs of crystal. From the regular forms in which these natural crystals are found, the regular arrangement of salts into different figures takes the name of *crystallization*, and both are probably owing to the same cause*. Henckel gives us a remarkable account of the formation of crystal out of human urine. He once filled a large round glass-vessel half way up with the recent urine of a young lad, and tying a bladder over the mouth of the vessel, set it in a stove for four years together, never stirring it during that whole time. At the end of this time he found a number of small white stones growing to the inside of the glass; they were of the size of an oat-seed, of a prismatic figure, and tolerably pellucid: they stuck so fast to the sides of the glass that they could not be washed off by the shaking about of the urine; and when taken out had no saline taste, and were not soluble even in hot water.

Among the largest and finest crystals we have any account of, were those found in the mountains of Grimsfule between immense strata of stone. They were all as pure and limpid as the clearest water, and the largest of them measured near three feet in length, and little less in circumference; its weight was 250 pounds. Others were of 130, 100, and so on, till they came to 10 pounds weight; but these were the smallest found in that place. Neuman, however, tells us of a piece mentioned in the Bresslaw collections, which weighed upwards of 400 weight. In the Imperial collection at Vienna, there is a pyramidal crystal vase two ells in height, cut wholly out of one piece. It is usual with the largest crystals of the German mountains to be full of cracks and flaws, and to

be so constructed internally as to shew all the prismatic colours; but the above mentioned ones were quite free from these blemishes, and resembled columns of the purest glass, only much clearer than any glass can be made. Crystal is also found in many parts of Britain and Ireland. About Bristol it is found of an amethystine tinge. In Silesia and Bohemia, in Germany, it is found stained with the colours of the ruby, sapphire, emerald, and topaz; in which case jewellers make great advantage of it, selling it under the name of *accidental sapphire*, &c.

Crystal is frequently cut; and lustres, vases, and toys, are made of it as of other beautiful stones. For this purpose it is to be chosen perfectly clear and transparent. It is to be tried by aqua fortis, or by drawing it along a pane of glass. The genuine crystal will not be affected by the acid, and will cut glass almost like a diamond. When any piece of workmanship of natural crystal is become foul and dark, the following method is to be used for recovering its brightness without hurting the polish. Mix together six parts of common water, and one part of brandy; boil these over a brisk fire, and let the crystal be kept in it, in a boiling state, a quarter of an hour; then take it out, and rub it carefully over with a brush dipped in the same liquor; after this it is to be wiped with a napkin, and by that means its surface will be perfectly cleaned, and rendered as bright as at first, without any injury to the points of the cutting, or the polish of the planes or facets, which would probably have happened had the cleaning been attempted by mere rubbing with a cloth.

Natural crystal may be reduced by calcination into a state proper for making glass with alkaline salts, and thus becomes a very valuable frit. The method of doing it is as follows: calcine natural crystal in a crucible; when it is red-hot throw it into cold water. Repeat this eight times, covering the crucible that no dust or ashes may get in among the crystal. Dry this calcined mass, and reduce it to an impalpable powder.

Colouring CRYSTAL, for the imitation of gems. See DOUBLET.

CRYSTAL is also used for a facitious body, cast in glass-houses, called *crystal-glass*; being, in fact, no more than glass carried, in the composition and manufacture, to a greater perfection than the common glass.

The best kind of glass-crystal is that called *Venice-crystal*, made at Moran near Venice. See GLASS.

Island CRYSTAL. See ISLAND CRYSTAL.

CRYSTAL Dew. See DEW.

Disdiaclastic CRYSTAL. See DISDIACLASTIC.

Rock-CRYSTAL. See ROCK-CRYSTAL.

CRYSTALLINE, in general, something composed of, or resembling, crystal. See CRYSTAL.

CRYSTALLINE *Heavens*, in ancient astronomy, two spheres, imagined between the primum mobile and the firmament, in the Ptolemaic system, which supposes the heavens solid, and only susceptible of a single motion. See ASTRONOMY, n° 72.

CRYSTALLINE *Humour*. See ANATOMY, n° 406. p.

CRYSTALLINE, or CRYSTALLINES, in medicine, are pustules filled with water, and so called on account of their transparency. They are one of the worst symptoms attendant on a gonorrhœa. They are

Crystal
Crystalline.

* See Crystallization.

are lodged on the prepuce, without pain; and though caused by coition, have nothing of infection attending them. The cause is supposed to be a contusion of the lymphatic vessels in the part affected. Dr Cockburn, who hath described this case, recommends for the cure a mixture of three parts of lime-water, and two of rectified spirit of wine, to be used warm, as a lotion, three times a-day.

CRYSTALLIZATION, in general, signifies the natural formation of any substance into a regular figure, resembling that of natural crystal. Hence the phrases of crystallized ores, crystallized salts, &c. and even the basaltic rocks are now generally reckoned to be effects of this operation. See BASALTES, and VOLCANO. The term, however, is most commonly applied to bodies of the saline kind, and their separation in regular figures from the water, or other fluid in which they were dissolved, is called their *crystallization* *. The word *crystallization* is never applied to the freezing of water, or to the consolidation of metals after they have been melted; though it might certainly be applied with as much justice to these substances as to any others; for all of them concrete into a certain regular form, from which they never deviate, unless disturbed. When water freezes slowly, it always forms regular crystals of ice, which are constantly of the same form. They are long, needle-like masses, flattened on one side, and joined together in such a manner, that the smaller are inserted into the sides of the greater; and thus these compound crystals have the appearance of feathers, or branches of trees with leaves. The most remarkable circumstance attending this crystallization is, that the angle formed by the insertion of the smaller pieces into the larger is either 60, or 120 degrees. The figures assumed by metals of different kinds have not been so exactly investigated, except in the regulus of antimony, which is observed always to take a stellated form. Experience also shews, that all kinds of earths, or other mineral matters, are capable of assuming a crystalline form, and may easily be made to do so by taking away part of the water which dissolves them.

Different salts assume different figures in crystallization, and are thus most easily distinguished from one another. The methods of reducing them into this form, for sale, are mentioned under the article CHEMISTRY, n° 74. But besides the large crystals produced in this way, each salt is capable of assuming a very different appearance of the crystalline kind, when only a single drop of the saline solution is made use of, and the crystallization viewed through a microscope. For our knowledge of this species of crystallization we are indebted to Mr Henry Baker, who was presented with a gold medal for the discovery, in the year 1744. These microscopical crystals he distinguishes from the large ones by the name of *configurations*; but this term seems inaccurate, and the distinction may well enough be preserved by calling the large ones the *common*, and the small ones the *microscopical* crystals of the salt. His method of making these observations he gives in the following words:

"I dissolve the subject, to be examined, in no larger a quantity of rain or river water than I am certain it is sufficient to saturate. If it is a body easily

dissolvable, I make use of cold water; or otherwise I make the water warm, hot, or even boiling, according as I find it necessary. After it is perfectly dissolved, I let it rest for some hours, till, if overcharged, the redundant saline particles may be precipitated, and settle to the bottom, or shoot into crystals; by which means I am most likely to have a solution of the same strength at one time as at another; that is, a solution fully charged with as much as it can hold up, and no more; and by these precautions the configurations appear alike, how often soever tried: whereas, if the water be less saturated, the proportions at different times will be subject to more uncertainty; and if it be examined before such separation and precipitation of the redundant salts, little more will be seen than a confused mass of crystals.

"The solution being thus prepared, I take up a drop of it with a goose quill cut in fashion of a scoop, and place it on a flat slip of glass of about three quarters of an inch in width, and between three and four inches long, spreading it on the glass with the quill, in either a round or an oval figure, till it appears a quarter of an inch, or more, in diameter, and so shallow as to rise very little above the surface of the glass. When it is so disposed, I hold it as level as I can over the clear part of a fire that is not too fierce, or over the flame of a candle, at a distance proportionable to the heat it requires, (which experience only can direct), and watch it very carefully till I discover the saline particles beginning to gather and look white, or of some other colour at the extremities of the edges. Then, (having adjusted the microscope before-hand for its reception, armed with the fourth glass, which is the fittest for most of those experiments), I place it under my eye, and bring it exactly to the focus of the magnifier; and, after running over the whole drop, I fix my attention on that side where I observe any increase or pushing forwards of crystalline matter from the circumference towards the centre.

"This motion is extremely slow at the beginning, unless the drop has been overheated, but quickens as the water evaporates; and, in many kinds, towards the conclusion, produces configurations with a swiftness inconceivable, composed of an infinity of parts, which are adjusted to each other with an elegance, regularity, and order, beyond what the exactest pencil in the world, guided by the ruler and compasses, can ever equal, or the most luxuriant imagination fancy.

"When this action once begins, the eye cannot be taken off, even for a moment, without losing something worth observation: for the figures alter every instant till the whole process is over; and, in many sorts, after all seems at an end, new forms arise, different entirely from any that appeared before, and which probably are owing to some small quantity of salt of another kind, which the other separates from, and leaves to act after itself has done: and in some subjects, three or four different sorts are observable, few or none of them being simple and homogeneous.

"When the configurations are fully formed, and all the water evaporated, most kinds of them are soon destroyed again by the moisture or action of the air upon them; their points and angles lose their sharpness,

* See Chemistry, n° 74.

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tion.** nefs, become uneven and defaced, and moulder, as it were, away. But some few are permanent, and being inclosed between glasses, may be preserved months, or even years, entertaining objects for the microscope.

"It happens oftentimes that a drop of saline solution can hardly be spread on the slip of glass, by reason of the glass's smoothness, but breaks into little globules, as it would do if the surface were greasy; this was very troublesome, till I found a way of preventing it, by rubbing the broken drop with my finger over the glass, so as to leave the surface smeared with it; on which smeared place, when dry, another drop of the solution may be spread very easily in what form one pleases.

"It likewise sometimes happens, that when a heated drop is placed properly enough for examination, the observer finds he can distinguish nothing: which is owing to saline steams that rise from the drop, cover and obscure the object-glass, and therefore must immediately be wiped away with a soft cloth or leather.

"In all examinations by the microscope of saline solutions, even though made in the day-time, I always employ the light of a candle, and advise every observer to do so likewise: for the configurations being exceedingly transparent, are rendered much more distinguishable by the brown light a candle affords, than by the more white and transparent day-light; and besides, either by moving the candle or turning the microscope, such light may be varied or directed just as the object requires."

In this manner were produced the beautiful crystallizations represented Plate LXXXV. They are vastly different from such crystals of the same salts as are obtained by the common processes; but Mr Baker assures us they are no less constant and invariable than they, and that he has repeated the experiments a great number of times with the same success.

Fig. 1. shews the microscopical crystals of *nitre* or *salt-petre*. These shoot from the edges, with very little heat, into flattish figures of various lengths, exceedingly transparent, and with straight and parallel sides. They are shewn in their different degrees of progression at the letters *a, b, c, d, e*; where *a*, represents how they first begin. After numbers of these are formed, they will often dissolve under the eye, and disappear entirely; but if one waits a little, new shoots will push out, and the process go on afresh. These first figures sometimes enlarge only without altering their shapes, and sometimes form in such sort as the drop represents; but if the heat has been too great they shoot hastily into numerous ramifications very numerous and very beautiful, but very difficult to be drawn; and which Mr Baker therefore did not attempt. There seems all the while a violent agitation in the fluid, and most commonly, towards the conclusion, a few octaedra (composed of eight triangular planes, or two quadrangular pyramids, joined base to base), make their appearance.

2. *Blue vitriol*, produces crystals round the edges, very short at the beginning, but increasing gradually, as represented at the figures 1, 2, 3, which denote their difference of form, and the progress of their

growth. These crystalline shoots are solid, regular, transparent, and reflect the light very beautifully from their polished sides and angles. As the watery part evaporates, numbers of long slender bodies like hairs are seen here and there, some lying side by side, or crossing each other as at 4, others forming star-like figures with many radiations (5, 5). This salt shoots but slowly, and therefore requires patience. At last the true crystals begin to appear commonly in the middle of the drop, and are very prettily branched, as at 6.

3. *Distilled verdigrease*, dissolved as above directed, and immediately applied to the microscope, shews a abundance of the regular figures 1, 2, 3, 4, 5, 6, 7: but if the solution is suffered to stand for a few hours, and a drop of it is then heated over the fire on a slip of glass, till it begins to congregate about the sides, and then examined, sharp-pointed, solid, figures, bisected by a line cut through the middle, from which they are cut away towards the edges, begin to appear, and shooting forwards (1, 1, 1). These figures are often striated very prettily from the middle line to the edges obliquely, (2, 2); and frequently they arise in clusters; and shooting from a centre (3, 3). These figures are a long time in growing; and whilst they are doing so, several regular crystals appear forming in several parts of the drop, of the most lovely emerald colour, and reflecting the light from their sides and angles, which are most exactly disposed, and finely polished. No crystals are formed in the middle, till the water is nearly evaporated; and then they begin to form hastily, for which reason they must be carefully attended. Their common figure resembles two long *ss* crossing each other in an angle of about 60°, and shooting branches every way: each of which again protrudes other branches from one, and sometimes from both its sides; making together an appearance like four leaves of fern conjoined by their stalks (5, 5). Separate clusters of the same sharp pointed figures as those at the edges of the drop, are also formed in the middle of it (6). Sometimes also they put on another form, like the leaves of dandelion, (7). Very beautiful figures are likewise produced by a kind of combination of sharp points and branches, (8, 8). All these crystals are of a most beautiful green colour, but deeper or lighter, according to the time of their production. The deepest are constantly produced first, and the paler ones afterwards. Towards the end of the process some circular figures are formed, extremely thin, and so slightly tinged, with green lines radiating from a centre, as to be almost colourless (9, 9). When all seems in a manner over, bundles of hair-like bodies appear frequently scattered here and there throughout the drop, like those of blue vitriol already described.

4. *Alum*. The microscopical crystals of this salt prove more or less perfect according to the strength of the solution and the degree of heat employed in making the experiment. The solution of alum, however saturated with the salt, will not be found overstrong after standing some days; for in that time many crystals will have formed in it. This separation will often leave the remainder too weak for the purpose; but by holding the vial over, or near the fire, the crystals will again dissolve. After it has stood about half an hour, it may then be used. The drop, put on the

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crystallization.

the glass, and properly heated, exhibits commonly at first a dark cloud which appears in motion somewhere near the edge, and runs pretty swiftly both to the right and left, until it is either stopped by the intervention of regular crystals, or else it proceeds both ways at once, till having surrounded the whole drop, the two ends rush together, and join into one (*a, a*). This cloudy part, which seems to be violently agitated while it is running round, appears on a strict examination to consist of salts, shot into long and very slender lines, much finer than the smallest hair, crossing each other at right angles. As they go along, rows of solid crystals are produced from their internal edges. These are composed of many oblique plain sides, (*b, b*), and which have all a tendency towards the figures of the regular crystals to be described presently. But it frequently happens, that, in some parts of the drop, many minute and circular figures are seen, rising at some little distances from the edge, which enlarging themselves continually, appear at last of a star-like form (*c, c*). The crystals in the middle seldom appear till the fluid seems almost wholly evaporated; when, on a sudden, many straight lines appear pushing forwards, whose sides or edges are jagged, and from which other similar straight and jagged lines shoot out at right angles with the first. These again have other small ones of the same kind shooting out likewise from themselves, and compose altogether a most beautiful and elegant configuration (*D*). Each of these lines increasing in breadth towards its end, appears somewhat club-headed (*e, e, e*). Sometimes, instead of sending branches from their sides, many of these lines rise parallel to each other, resembling a kind of palisade, and having numberless minute transverse lines running between them (*F*). But the most wonderful part of all, though not producible without an exact degree of heat and right management, is the dark ground work (*G*). It consists of an infinity of parallel lines, having others crossing them at right angles, and producing a variety scarce conceivable from lines disposed in no other manner: the direction of the lines (which are exquisitely straight and delicate) being so frequently and differently changed, that one would think it the result of long study and contrivance. During the time this ground work is framing, certain lucid points present themselves to view most commonly on one side. These grow continually larger, with radiations from a centre, and become star-like figures as before-mentioned. Some of them send out long tails, which give them the appearance of comets: and at the end of all, a dark lineation in various directions darts frequently through, and occupies all, or most of the spaces between them, making thereby no ill representation, when viewed by candle-light, of a dark sky, illuminated with stars and comets. The regular crystals are often formed in the same drop with the others (*f*).

5. *Borax*. If a drop of solution of borax is held too long over the fire, it hardens on the slip of glass in such a manner that no crystals can appear. The best method is to give it a brisk heat for about a second, and then applying it to the microscope, the crystals will quickly form themselves as represented in the figure.

6. *Sal ammoniac* begins with shooting from the edges great numbers of sharp, but thick and broad spi-

culæ, from whose sides are protruded as they rise, Crystallization.
many others of the same shape, but very short; parallel to each other, but perpendicular to their main stem (*1*). These spiculæ arrange themselves in all directions; but for the most part obliquely to the plane from whence they rise, and many are frequently seen parallel to one another (*1, 1*). As they continue to push forwards, which they do without increasing much in breadth, some shoot from them the small spiculæ only (*2*); others divide in a singular manner by the splitting of the stem (*3*); and others branch out into smaller ramifications (*4*). Before the middle of the drop begins to shoot, several exceedingly minute bodies may be discerned at the bottom of the fluid. These, in a little while rise to the top, and soon distinguish their shape as at (*5*). Their growth is very quick, and for some time pretty equal; but at last some branch gets the better of the rest, and forms the figure (*6*). The other branches enlarge but little after this, all the attraction seeming to be lodged in that one that first began to lengthen; and from this, more branches being protruded, and they again protruding others, the whole appears as at (*8*). It is not uncommon to see in the middle of the drop, some crystals, where instead of the straight stems above described, there is formed a kind of zig-zag, with spiculæ like those in the other figures (*7*).

7. *Salt of Lead, or saccharum saturni*. A little of this salt dissolved in hot water, which it immediately renders milky, after standing a quarter of an hour to subside, is in a fit condition for an examination by the microscope. A drop of it then applied on a slip of glass and held over the fire to put the particles in action, will be seen forming round the edge a pretty even and regular border of a clear and transparent film or glewy substance (*a a a a*); which if too sudden and violent a heat be given, runs over the whole area of the drop, and hardens so on the glass as not to be got off without great difficulty. But if a moderate warmth be made use of, which likewise must not be too long continued, this border proceeds only a little way into the drop, with a kind of radiated figure composed of fine lines, or rather bundles of lines, beginning from the centres in the interior edge of the border, and spreading out at nearly equal distances from each other every way, towards the exterior (*b b b b*). From the same centres are produced afterwards a radiation inwards, composed of parallelograms of different lengths and breadths; from one, and sometimes both the angles of these, are frequently seen shootings so exceedingly slender, that they are perhaps the best possible representations of a mathematical line. The extremities of the parallelograms are generally cut off at right angles; but they are sometimes also seen oblique (*c c c c*). Centres with the like radii issuing from them, and some of the glutinous matter for their root, are sometimes formed in the drop, entirely detached from the edges; and in these it is very frequent to find a kind of secondary radii proceeding from some of the primary ones; and others from them again to a great number of gradations, forming thereby a very pretty figure (*D*).

8. *Salt of Tin*, produces at the edges of the drop a number of octædra, partly transparent, standing on long;

Crystallization. long necks, at small distances from each other, with angular shoots between them (*a a*). At the same time, solid and regular opaque cubes will be seen forming themselves in other parts of the drop, (*b b*). In the middle of the same drop, and in several other parts of it very different figures will also be formed; particularly great numbers of flat, thin, transparent, hexangular bodies (*c c c*); some among which are thicker (*e*), and a few appear more solid, and with six sloping sides rising to a point, as if cut and polished (*d*). The figure (*f*) is composed of two high pyramids united at their base. Some in this kind of form are found truncated at one of their ends, and others at both. Several of the hexagonal bodies may be observed with sloping sides, forming a smooth, triangular, rising plane, whose angles point to three intermediate sides of the hexagon (*g*).

9. *Epson Salt*, begins to shoot from the edge in jagged figures (*a*). From other parts differently figured crystals extend themselves towards the middle, some of which have fine lines proceeding from both sides of a main stem, in an oblique direction; those on one side shooting upwards in an angle of about 60°, and those on the other downwards in the same obliquity (*c, f*). Others produce jags from their sides nearly perpendicular to the main stem, thereby forming figures that resemble some species of the polipody (*e*); but in others the jags are shorter (*d*). Now and then one of the main stems continues shooting to a considerable length, without any branchings from the sides; but at last sends out two branches from its extremity (*g*). Sometimes a figure is produced having many fine and minute lines radiating from a centre (*b*). The last shootings in the middle of the drop (*h*) are not unlike the frame work for the flooring or roofing of a house, but with the angles oblique: and sometimes a form of another kind presents itself (*i*).

10. *Scarborough Salt*, begins to shoot from the edges: first of all in portions of quadrilateral figures, much resembling those of common salt; but two of their angles, instead of 90, are about 100°. They shoot in great numbers round the borders of the drop, having their sides as nearly parallel to one another as the figure of the drop will allow: some proceed but a little way, others farther, before they renew the shoot (*a a*). In some places they appear more pointed and longer (*b*); and sometimes, instead of the diagonal, one of the sides is seen towards the edge, and the other shooting into the middle (*c*). The middle crystals (*d, f*) seem to be of the vitriolic kind.

11. *Glauber's Salt*, produces ramifications from the side of the drop, like the growth of minute plants, but extremely transparent and elegant (*c*). Some of them, however, begin to shoot from a centre at some distance from the edge, and protrude branches from that centre in a contrary direction (*b*). Sometimes they shoot from one, and sometimes from more sides of the central point in different varieties (*d*). Other figures are produced from different parts of the edge of the drop (*a, f, e*); but the most remarkable and beautiful crystallization forms last of all near the middle of the drop. It is composed of a number of lines proceeding from one another at right angles with transparent spaces and divisions running between them, appearing

all together like streets, alleys, and squares, (*g g*). When this crystallization begins, it forms with great rapidity, affording the observer a very agreeable entertainment: but its beauty is of very short duration: in a few moments it dissolves and vanishes like melted ice, which renders the drawing of it very difficult.

12. *Salt of Jesuits bark*. The few shootings which this salt produces at the edge of the drop are of no regular figure (*a*). The whole area becomes quickly filled with great numbers of rhombi, of different sizes, extremely thin and transparent (*b*). Some of these enlarge greatly and acquire a considerable thickness, forming themselves into solids of many sides (*c c*). Near the conclusion some crystals of sea-salt are formed (*d d*), and likewise a few odd triangular figures (*e*).

13. *Salt of Liquorice*, begins shooting from the edge with a sort of rhombic spiculae (*a*). Some four branched figures like those of vitriol, commonly appear, but moulder away before their ramifications are completed, leaving only their stamina behind (*b b*). The middle of the drop is usually overlaid with great numbers of parallelograms, some exceedingly transparent, being mere planes; having sometimes one, sometimes more of the angles canted, in such a manner as to produce pentagonal, hexagonal, and other figures. Others have much thickness, and form parallelepipeds, prisms, (*c*). Some of the plane figures now and then protrude an irregular kind of shooting which appears very pretty (*d*).

14. *Salt of Wormwood*. The first shootings of this salt from the edges of the drop appear of a considerable thickness in proportion to their length: their sides are deeply and sharply jagged or indented, being made up of many somewhat obtuse angles, and their ends pointed with angles of the same kind (*a*). But other shoots frequently branch out from these original ones, and they again send forth others making all together a very pretty appearance (*b b*). The crystals of this salt are very different from each other, consisting of squares, rhombi, parallelograms, &c. (*c*).

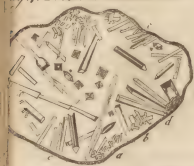
15. *Salt of Tobacco*. If a moderate degree of heat is given to a solution of this salt, its first shootings will be from the edges of the drop, in slender tapering figures, ending with very sharp points, but at considerable distances from one another. Along with these, are formed other crystals nearly of the same kind, but entirely detached, and farther within the drop, having the thicker ends towards the centre of the drop, and the sharp points turned towards its edge (*a*). When a little more heat has been given, other spiculae are produced from the edge, whose ends spread on either side, and then terminate in a point: and which have all along their sides triangular pointed crystals placed alternately so as to represent a zig-zag, with a line drawn through its middle (*b*). The regular crystals are produced in the middle of the drop, and are either hexagons or rhombi (*c*). When the moisture is nearly exhaled there are sometimes seen to shoot from, or rather under the spiculae, upon the plane of the glass, a representation of leaves very small at their first appearance, but gradually increasing (*d*). A violent agitation may be discovered in the fluid by the first magnifier, during the whole process;

but

Crystallization.



1. Nitron Salt Pelv.



2. Blue Vitriol.



3. Verdigrise distilled.



4. Alum.



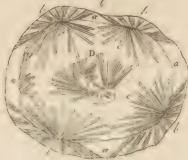
5. Borax.



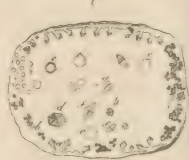
6. Salt Armenian.



7. Salt of Lead.



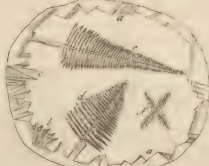
8. Salt of Tin.



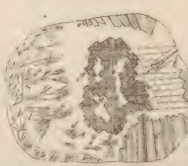
9. Epsom Salt.



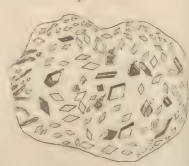
10. Scarborough Salt.



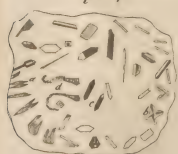
11. Glauber's Salts.



12. Salt of Quass Bark.



13. Salt of Liquorice.



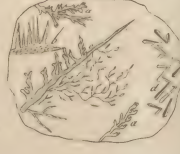
14. Salt of Wormwood.



15. Salt of Tobacco.



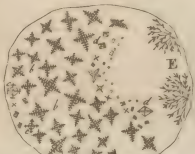
16. Salt of Hartshorn.



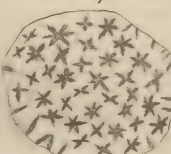
17. Salt of Trine.



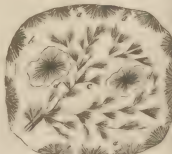
18. Rheum.



19. Camphir.



20. Manna.



A. Salt Sulph.

crystallization. but especially at the beginning, and extremely minute crystals rising from the bottom.

16. *Salt of Hartshorn*. On the application of a very small degree of heat, salt of hartshorn shoots near the edges of the drop into solid figures somewhat resembling razors or lancets, where the blade turns into the handle by a clasp (*d*). The crystals of this salt are produced with great velocity, and are somewhat opaque, shooting from the edges of the drop, on both sides a main stem, and with a kind of regularity, rugged branches like those of some sorts of coral (*a a*). But sometimes, instead of these branches, sharp spiculae, some plain, and others jagged, are protruded to a considerable depth on one side only (*b*). As the fluid exhales, some one of the branching figures generally extends to a great length, producing on one side shoots that are rugged and irregular, and, on the other, curious regular branches resembling those of some plant (*e*).

17. *Salt of Urine*, shoots from the edges of the drop in long parallelograms like nitre (*a a*). But in other places, along the sides of the drop solid angles are formed, that seem to be the rudiments of common salt (*b*). Some of the parallelograms increase much in size, and spread themselves in the middle, so as to change their first figure, and become three or four times bigger than the rest: and these have a dividing line that runs through their whole length from end to end, whence issue other short lines at small distances, opposite to one another; all pointing with the same degree of obliquity towards the base (*c c*). Among these enlarged figures, some few shoot still forward and tapering towards a point, but, before they form one, swell again, and begin as it were anew; and thus they proceed several times before their figure is quite finished (*d d*). The figures 1, 2, 3, 4, 5, 6, are the regular crystals of this salt when it is allowed to dissolve in the air, and no heat at all is given.

18. *Rheum*, or the clear liquor which distils from the nostrils when people catch cold, is strongly saturated with salt. A drop of it on a slip of glass will soon crystallize in a beautiful manner, either with, or without heat; but if heated to about the warmth of the blood, and then viewed through the microscope, many lucid points will be seen rising and increasing gradually, till their form is shewn to be quadrangular, with two transparent diagonals crossing each other (*d d*). These diagonals shoot soon after far beyond the square, protruding other lines at right angles from their sides; and thus they go on to form the most elegant and beautiful crystals. When a drop of rheum is set to crystallize without any heat, instead of branched crystals over the whole area, such are formed only in the middle; but, about the edges, plant-like figures are produced shooting several stems from one point, and resembling a kind of sea-moss (*E*).

19. *Cauphire*, though insoluble in water, dissolves very readily in spirit of wine. A drop of this solution spread upon a slip of glass crystallizes instantly in the beautiful manner represented in the figure.

20. *Manna* easily dissolves in water, and a drop of the solution is a very pretty object. Its first shootings are radiations from points at the very edge of the drop: the radiating lines seem opaque, but are very

slender (*a a a*). Amongst these arise many minute transparent columns, whose ends grow wider gradually as they extend in length, and terminate at last with some degree of obliquity (*b*). Some few figures radiating from a centre every way, and circumscribed by an outline, are produced within the drop (*d d*). But the most surprising and elegant configuration is composed of many clusters of radiations shooting one from another over great part of the drop, and making all together a figure not unlike a certain very beautiful sea-plant. The regular crystals are represented at (*e*).

The above are the most remarkable crystallizations described by Mr Baker. He endeavours in some measure to account for them; but neither he, nor any other person, hath as yet been able to say any thing satisfactory on the subject. It hath never been shewn with any degree of plausibility why salts should assume any regular figure at all; much less why every one should have a form peculiar to itself. Sir Isaac Newton endeavoured to account for this, by supposing the particles of salt to be diffused through the solvent fluid at equal distances from each other; and consequently he thought the power of attraction between the saline particles could not fail to bring them together in regular figures, as soon as the diminution of the heat suffered them to act upon each other. But it is certain that some other agent must be concerned in this operation than mere attraction, otherwise all salts would crystallize in the same manner. Others therefore have had recourse to some kind of polarity in the particles of each salt, which determined them to arrange themselves in such a certain form. But unless we give a reason for this *polarity*, we only explain crystallization by itself when we give that as the cause. One thing which seems to have been entirely overlooked by those who attempt to investigate this subject is, that the saline particles do not only attract one another, but also some part of the water which dissolves them. Did they only attract each other, the salt, instead of crystallizing, would fall to the bottom as a powder. But instead of this, a saline crystal is composed of salt and water as certainly as the body of an animal is composed of flesh and blood, or a vegetable, of solid matter and sap; if a saline crystal is deprived of its aqueous part, it will as certainly lose its crystalline form as if it was deprived of the saline part. The most probable conjecture therefore on this subject would seem to be, that crystallization is a species of vegetation, and is accomplished by the same powers to which the growth of plants and animals are to be ascribed. See *VEGETATION*.

CRYSTALS, in chemistry, salts or other matters shot, or congealed, in the manner of crystal. See *CHEMISTRY*, n° 74.; and *CRYSTALLIZATION*.

CTESIAS, a native of Cnidos, who accompanied Cyrus the son of Darius in his expedition against his brother Artaxerxes; by whom he was taken prisoner. But curing Artaxerxes of a wound he received in the battle, he became a great favourite at the court of Persia, where he continued practising physic for 17 years, and was employed in several negotiations. He wrote the *History of Persia* in 23 books, and a *History of the Indies*: but these works are now lost, and

Crystals
↑
Ctesias.

Cæſſiphon
Cuba.

all we have remaining of them is an abridgement compiled by Photius. The most judicious among the ancients looked upon Cæſias as a fabulous writer; yet several of the ancient historians and modern Christian writers have adopted in part his chronology of the Assyrian kings.

CÆſIPHON, a celebrated Greek architect, who gave the designs for the famous temple of Epheſus, and invented a machine for bringing thither the columns to be used in that noble structure. He flourished 544 B. C.

CUB, a bear's whelp. Among hunters, a fox and marten of the first year are also called *cubs*. See URUS.

CUBA, a large, and very important island in the West Indies, belonging to Spain. On the east-side it begins at 20. 20. N. Lat. touches the tropic of cancer on the north, and extends from 74. to 85. 15. W. Long. It lies 60 miles to the west of Hispaniola, 25 leagues north of Jamaica, 100 miles to the east of Jucatan, and as many to the south of Cape Florida; and commands the entrance of the gulphs both of Mexico and Florida, as also the windward passages. By this situation it may be called the *key* of the West Indies. It was discovered by Columbus in 1492, who gave it the name of Ferdinand, in honour of king Ferdinand of Spain; but it quickly after recovered its ancient name of *Cuba*. The natives did not regard Columbus with a very favourable eye at his landing, and the weather proving very tempestuous, he soon left this island, and sailed to *Hayti*, now called *Hispaniola*, where he was better received. The Spaniards, however, soon became masters of it. By the year 1511, it was totally conquered; and in that time they had destroyed, according to their own accounts, several millions of people. But the possession of Cuba was far from answering the expectations of the Spanish adventurers, whose insatiable avarice could be satisfied with nothing but gold. These monsters finding that there was gold upon the island, concluded that it must come from mines; and therefore tortured the few inhabitants they had left, in order to extort from them a discovery of the places where these mines lay. The miseries endured by these poor creatures were such that they almost unanimously resolved to put an end to their own lives, but were prevented by one of the Spanish tyrants called *Vasco Perellos*. This wretch threatened to hang himself along with them, that he might have the pleasure, as he said, of tormenting them in the next world worse than he had done in this; and so much were they afraid of the Spaniards, that this threat diverted these poor savages from their desperate resolution. In 1511, the town of Havannah was built, now the principal place on the island. The houses were at first built only of wood; and the town itself was for a long time so inconsiderable, that in 1536 it was taken by a French pirate, who obliged the inhabitants to pay 700 ducats to save it from being burnt. The very day after the pirate's departure, three Spanish ships arrived from Mexico, and having unloaded their cargoes, failed in pursuit of the pirate ship. But such was the cowardice of the officers, that the pirate took all the three ships, and returning to the Havannah, obliged the inhabitants to pay 700 ducats more. To prevent mis-

Cuba.

fortunes of this kind the inhabitants built their houses of stone; and the place has since been strongly fortified. See HAVANNAH.

According to the Abbe Raynal, the Spanish settlement at Cuba is very important, on three accounts: 1. The produce of the country, which is considerable. 2. As being the staple of a great trade; and, 3. As being the key to the West Indies. The principal produce of this island is cotton. The commodity, however, through neglect, is now become so scarce, that sometimes several years pass without any of it being brought into Europe. In place of cotton, coffee has been cultivated: but, by a similar negligence, that is produced in no great quantity; the whole produce not exceeding 30 or 35 thousand weight, one-third of which is exported to Vera Cruz, and the rest to Madrid. The cultivation of coffee naturally leads to that of sugar; and this, which is the most valuable production of America, would of itself be sufficient to give Cuba that state of prosperity for which it seems designed by nature. Although the surface of the island is in general uneven and mountainous, yet it has plains sufficiently extensive, and well enough watered, to supply the consumption of the greatest part of Europe with sugar. The incredible fertility of its new lands, if properly managed, would enable it to surpass every other nation, however they may have now got the start of it: yet such is the indolence of the Spaniards, that to this day they have but few plantations, where, with the finest canes, they make but a small quantity of coarse sugar at a great expence. This serves partly for the Mexican market, and partly for the mother-country; while the indolent inhabitants are content to import sugar for themselves at the expence of near 220,000l. annually. It has been expected with probability, that the tobacco imported from Cuba would compensate this loss; for after furnishing Mexico and Peru, there was sufficient, with the little brought from Caracca and Buenos Ayres, to supply all Spain. But this trade too has declined through the negligence of the court of Madrid, in not gratifying the general taste for tobacco from the Havannah. The Spanish colonies have an universal trade in skins; and Cuba supplies annually about 10 or 12 thousand. The number might easily be increased in a country abounding with wild cattle where some gentlemen possess large tracts of ground, that for want of population can scarce be applied to any other purpose than that of breeding cattle. The hundredth part of this island is not yet cleared. The true plantations are all confined to the beautiful plains of the Havannah, and even those are not what they might be. All these plantations together may employ about 25000 male and female slaves. The number of whites, mestees, mulattoes, and free negroes, upon the whole island, amounts to about 30000. The food of these different species consists of excellent pork, very bad beef, and cassava bread. The colony would be more flourishing, if its productions had not been made the property of a company, whose exclusive privilege operates as a constant and invariable principle of discouragement. If any thing could supply the want of an open trade, and atone for the grievances occasioned by this monopoly at Cuba, it would be the advantage which this island has for
such

Cucbe
Cucubalus.

such a long time enjoyed, in being the rendezvous of almost all the Spanish vessels that sail to the new world. This practice commenced almost with the colony itself. Ponce de Leon, having made an attempt upon Florida in 1512, became acquainted with the new canal of Bahama. It was immediately discovered that this was the best route the ships bound from Mexico to Europe could possibly take; and to this the wealth of the island is principally, if not altogether, owing.

CUBE, in geometry, a solid body consisting of six equal sides. See **GEOMETRY**.

CUBE-Root of any Number, or Quantity, is such a number or quantity, which, if multiplied into itself, and then again the product thence arising by that number or quantity, being the cube-root, this last product shall be equal to the number or quantity whereof it is the cube-root; as 2 is the cube-root of 8; because two times 2 is 4, and two times 4 is 8; and $a + b$ is the cube-root of $a^3 + 3aab + 3abb + b^3$. See **ALGEBRA**, n° 8, p.

CUBEBS, in the materia medica, a small dried fruit, resembling a grain of pepper, but often somewhat longer, brought into Europe from the island of Java. In aromatic warmth and pungency, they are far inferior to pepper.

CUBIC EQUATION. See **ALGEBRA**, n° 22.

CUBIDIA, a genus of spars. The word is derived from *κῦβος* "a die;" and is given them from their being of the shape of a common die, or of a cubic figure. These bodies owe this shape to an admixture of lead, and there are only two known species of the genus. 1. A colourless crystalline one, with thin flakes, found in the lead-mines of Yorkshire, and some other parts of the kingdom; and 2. A milky white one with thicker crusts. This is found in the lead-mines of Derbyshire and Yorkshire, but is usually small, and is not found plentifully.

CUBIT, in the mensuration of the ancients, a long measure, equal to the length of a man's arm, from the elbow to the tip of the fingers.

Dr Arbuthnot makes the English cubit equal to 18 inches; the Roman cubit equal to 1 foot 5.406 inches; and the cubit of the scripture equal to 1 foot, 9.888 inches.

CUCKING-STOOL, an engine invented for punishing scolds and unquiet women, by ducking them in water; called in ancient time a *tumbrel*, and sometimes a *trebuchet*. In Domestday, it is called *cathedra stercoris*: and it was in use even in the Saxons time, by whom it was described to be *cathedra in qua rixosæ mulieres sedentes aquis demergebantur*. It was anciently also a punishment inflicted upon brewers and bakers transgressing the laws; who were thereupon in such a stool immersed over head and ears in *stercore*, some stinking water. Some think it a corruption from *ducking-stool*; others from *choaking-stool*, *quia hoc modo demersæ aquis sese suffocantur*. See **CASTIGATORY**.

CUCKOW, in ornithology. See **CUCULUS**.

CUCKOW-SPIR, the same with *stoth-spirit*. See **FROTH-SPIR**, and **CICADA**.

CUCUBALUS, BERRY-BEARING CHICKWEED; a genus of the trigynia order, belonging to the decan-

dria class of plants. There are 13 species, the most remarkable of which are,

Cucubalus
Cuculus.

1. The beken, Swedish lychnis, or gumfepungar, is a native of several parts of Europe. The empalement of its flower is curiously wrought like a network, and is of a purplish colour. The leaves have somewhat of the flavour of pease, and proved of great use to the inhabitants of Minorca in 1685, when a swarm of locusts had destroyed the harvest. The Gothlanders apply the leaves to erysipelatous eruptions. Horses, cows, sheep and goats, eat this plant.

2. The noctiflora, or night-flowering lychnis, grows naturally in Spain and Italy. It is a perennial plant, rising with an upright branching stalk, a foot and an half high, garnished with very narrow leaves placed opposite. The upper part of the stalk branches very much; the flowers stand upon long naked foot-stalks, each supporting three or four flowers which have long tubes with striped empalements: the petals are large, deeply divided at top, and of a pale-bluish colour. The flowers are closed all the day; but when the sun leaves them they expand, and then emit a very agreeable scent. It may be propagated by seeds sown in the spring on a bed of light earth; and when the plants are fit to remove, they should be planted in a nursery-bed at about four inches distance, where they may remain till autumn. They may then be planted in the borders where they are to remain, and will flower the following year.

3. The otter, or catch-fly, is a native of Britain, and other European countries. It hath a thick, fleshy, perennial root, which strikes deep into the ground, from whence rises a jointed stalk three or four feet high. At the joints there exudes a viscid clammy juice, that sticks to the fingers when handled; and the small insects which settle upon those parts of the stalks are thereby so fastened that they cannot get off. The flowers are small, and of a greenish colour. The plant is propagated by seeds.

CUCULUS, the CUCKOW, in ornithology, a genus belonging to the order of picæ. This singular bird appears in our country early in the spring, and makes the shortest stay with us of any bird of passage; it is compelled here, as Mr Stillingfleet observes, by that constitution of the air which causes the fig-tree put forth its fruit. It is very probable that these birds, or at least part of them, do not quit this island during the winter; but that they seek shelter in hollow trees and lie torpid, unless animated by unusually warm weather. Mr Pennant gives two instances of their being heard in February; one in 1771, in the end of that month; the other in 1769, on the 4th day; but after that, they were heard no more, being probably chilled again into torpidity. There is a remarkable coincidence between the song of these birds and the mac-karel's continuing in full roe; that is, from about the middle of April to the latter end of June. The cuckow is silent for some time after his arrival; his note is a call to love, and used only by the male, who sits perched generally on some dead tree or bare bough, and repeats his song, which he loses as soon as the amorous season is over. His note is so uniform, that his name in all languages seems to have been derived

Cuculus. ved from it; and in all countries it is used in the same reproachful sense :

The plain-song *cuckoo* grey,

Whose note full many a man doth mark,

And dares not answer nay.

Shakspear.

The reproach seems to arise from the cuckow's making use of the hed or nest of another to deposit its eggs in, leaving the care of its young to an improper parent ; but Juvenal with more justice gives the infamy to the bird in whole nest the supposititious eggs were laid :

Tu tibi tunc corruca paces.

A water-wagtail, a yellow-hammer, or hedge-sparrow, is generally the nurse of the young cuckows ; who if they happen to be hatched at the same time with the genuine offspring, quickly destroy them by over-laying them, as their growth is soon so greatly superior. The reason of this seeming want of natural affection in the cuckow, hath been long a question. It seems most probably to arise from the difference between the situation of the stomach in the cuckow and in other birds. The stomach of birds is situated quite in a different manner from what it is in other animals ; being almost joined to the back, secured by the bones of the reins, and covered before by the intestines, behind which it lies securely defended and concealed. This situation affords them a great facility and security of sitting on their eggs and young ; since the parts which lie immediately upon them are soft, warm, and pliable, and without danger from the compression, which would be hazardous, if the weight of a large and full stomach was to rest upon them, as in the very case of the cuckow. Besides, this singular structure secures a warm covering to the egg in hatching, and to the young as soon as hatched ; for their tender stomachs being defended from the impression of the cold air by a thin bone or cartilage only, would soon lose the warmth necessary to digestion, if it were not supplied by the incubation of the mother from time to time. The stomach of a cuckow, on the contrary, lies far forward, just under the integuments, and actually covers the intestines, the very reverse of what takes place in other birds. The cuckow's stomach is a large bag of uncommon capacity, adhering by a cellular tissue to all the parts that environ it, reaching all the way from the breast-bone to the vent. From such a structure and situation of the stomach, it naturally follows, that it is as difficult for a cuckow as it is easy for other birds to sit upon her eggs and young ; for the thin membranes of its large stomach charged so long with the weight of its whole body, together with the aliments contained therein, would prove an intolerable compression both to it and its tender young. It also follows from the peculiar structure of this bird, that its young do not stand in need of being covered like those of other birds ; their large and capacious stomachs being better secured from cold by means of lying covered under the mass of intestines.

This bird has been ridiculously believed to change into a hawk, and to devour its nurse on quitting the nest ; whence the French proverb, " Ingrat comme un coucou." But it feeds on no larger animals than worms and insects. It grows very fat, and is said to be as good eating as a land-rail. The French and Ita-

lians eat them to this day. The Romans admired them greatly as a food. Pliny says that there is no bird which can compare with them for delicacy.

The weight of the cuckow is little more than five ounces : the length 14 inches ; the breadth 25. The bill is black, very strong, a little incurved, and about two thirds of an inch in length. The head, hind part of the neck, coverts of the wings and rump, are of a dove colour ; darker on the head, and paler on the rump. The throat and upper part of the neck are of a pale grey ; the breast and belly white, crossed elegantly with undulated lines of black. The tail consists of ten feathers of unequal lengths ; the two middle are black tipped with white ; the others are marked with white spots on each side their shafts. The legs are short ; and the toes disposed two backwards, and two forwards, like those of the woodpecker, though it is never observed to run up the sides of trees. The female differs in some respects. The neck before and behind is of a brownish-red ; the tail barred with the same colour, and black, and spotted on each side the shaft with white. The young birds are brown mixed with black, and in that state have been described by some authors as old ones.

Linnæus enumerates no fewer than 22 species of this genus, which inhabit different parts of the globe, and are chiefly distinguished by the shape of the tail, and variations in colour. The most remarkable are,

1. The Americanus, or cuckow of Carolina. It is about the size of a blackbird ; the bill a little hooked and sharp ; the upper mandible black, the lower yellow ; the large wing-feathers are reddish ; the rest of the wing, and all the upper part of the body, head and neck, is of an ash-colour ; all the under part of the body, from the bill to the tail, white ; the tail long and narrow, composed of six long and four shorter feathers,—the two middlemost ash-coloured, the rest black with their ends white ; their legs short and strong, having two back toes, and two before. Their note is very different from the cuckow of this country, and not so remarkable to be taken notice of. It is a solitary bird, frequenting the darkest recesses of woods and shady thickets. They retire on the approach of winter.

2. The indicator, or honey-guide, is a native of Africa. The following description is given of it by Dr Sparrman in the Philosophical Transactions for 1777. " This curious species of cuckow is found at a considerable distance from the Cape of Good Hope, in the interior parts of Africa, being entirely unknown at that settlement. The first place I heard of it was in a wood called the *Groot-vader's Bosch*, " the Grand-father's Wood," situated in a desert near the river which the Hottentots call *T'kau'kai*. The Dutch settlers thereabouts have given this bird the name of *honinguizer*, or " honey-guide," from its quality of discovering wild honey to travellers. Its colour has nothing striking or beautiful. Its size is considerably smaller than that of our cuckow in Europe ; but in return, the instinct which prompts it to seek its food in a singular manner is truly admirable. Not only the Dutch and Hottentots, but likewise a species of quadruped named *ratel*, (probably a new species of badger), are frequently conducted to wild bee-hives by this bird, which, as it were, pilots them to the very spot. The honey

cucumber
Cucumis.

honey being its favourite food, its own interest prompts it to be instrumental in robbing the hive, as some scraps are commonly left for its support. The morning and evening are its times of feeding, and it is then heard calling in a shrill tone, *cherr, cherr*; which the honey-hunters carefully attend to as the summons to the chase. From time to time they answer with a soft whistle; which the bird hearing, always continues its note. As soon as they are in sight of each other, the bird gradually flutters toward the place where the hive is situated, continually repeating its former call of *cherr, cherr*: nay, if it should happen to have gained a considerable way before the men, (who may easily be hindered in the pursuit by bushes, rivers, or the like), it returns to them again, and redoubles its note, as if it were to reproach them with their inactivity. At last the bird is observed to hover for a few moments over a certain spot, and then silently retiring to a neighbouring bush or resting-place, the hunters are sure of finding the bees nest in that identical spot, whether it be in a tree or in the crevice of a rock, or (as is most commonly the case) in the earth. Whilst the hunters are busy in taking the honey, the bird is seen looking on attentively to what is going forward, and waiting for its share of the spoil. The bee-hunters never fail to leave a small portion for their conductor; but commonly take care not to leave so much as would satisfy its hunger. The bird's appetite being whetted by this parsimony, it is obliged to commit a second treason, by discovering another bee's nest, in hopes of a better salary. It is further observed, that the nearer the bird approaches the hidden hive, the more frequently it repeats its call, and seems the more impatient.

"I have had frequent opportunities of seeing this bird, and have been witness to the destruction of several republics of bees by means of its treachery. I had, however, but two opportunities of shooting it, which I did to the great indignation of my Hottentots. It is about seven inches in length, and is of a rusty brown colour on the back, with a white breast and belly." See Plate LXXXVI.

CUCUMBER, in botany. See CUCUMIS.

CUCUMIS, the CUCUMBER; a genus of the syn-genefia order, belonging to the monœcia class of plants. In this genus Linnaeus includes also the MELON; (see that article). There are 11 species, of which the following are the most remarkable.

1. The fativa, or common cucumber, hath roots composed of numerous, long, slender, white fibres; long slender stalks, very branchy at their joints, trailing on the ground, or climbing by their clasping, adorned at every joint by large angular leaves on long erect footstalks, with numerous monopetalous bell-shaped flowers of a yellow colour, succeeded by oblong rough fruit. The varieties of this kind are, (1.) The common rough green prickly cucumber; a middle-sized fruit, about six or seven inches long, having a dark-green rough rind, closely set with very small prickles; the plant is of the hardiest sort, but does not shew its fruit early. (2.) The short green prickly cucumber is about three or four inches long; the rind rather smooth, and set with small black prickles. It is valuable chiefly for being one of the

earliest and hardiest sorts. (3.) The long green prickly cucumber, grows from six to nine inches in length, and is rather thinly set with prickles. And as there is an early and late cucumber, it is considerably the best variety for the main crops, both in the frames and hand-glass, as well as in the open ground for pricklers. Of this there is another variety with white fruit. (4.) The early green cluster cucumber is a shortish fruit, remarkable for growing in clusters, and appearing early. (5.) The long smooth green Turkey cucumber, is a smooth green-rinded fruit, growing from 10 to 15 inches in length, without prickles. The plants are strong growers, with very large leaves. (6.) The long smooth white Turkey cucumber, is a smooth-rinded fruit, from 10 to 15 inches long, without prickles. (7.) The large smooth green Roman cucumber is a very large and long smooth green fruit produced from a strong growing plant. (8.) The long white prickly Dutch cucumber, is a white fruit 8 or 10 inches long, set with small black prickles; the plants are but bad bearers in this country.

2. The chata, or round-leaved Egyptian cucumber. According to Mr Haffelquist, this grows in the fertile earth near Cairo after the inundation of the Nile, and not in any other place in Egypt, nor does it grow in any other soil. It ripens with the water-melons. The fruit is a little watery; the flesh almost of the same substance with the melons; it tastes somewhat sweet and cool; but is far from being as cool as the water-melons. This the grandees and Europeans in Egypt eat as the most pleasant fruit they find, and that from which they have the least to apprehend. It is the most excellent fruit of this tribe of any yet known.

The four first varieties of the cucumis fativa are those chiefly cultivated in this country. They are raised at three different seasons of the year: 1. on hot-beds, for early fruit; 2. under bell, or hand-glasses, for the middle crop; 3. on the common ground, which is for a late crop, or to pickle. The cucumbers which are ripe before April are unwholesome; being raised wholly by the heat of the dung without the assistance of the sun. Those raised in April are good, and are raised in the following manner.

Towards the latter end of January, a quantity of fresh horse-dung must be procured with the litter among it; and a small proportion of sea-coal ashes should be added to it. In four or five days the dung will begin to heat; at which time a little of it may be drawn flat on the outside, and covered with two inches thickness of good earth: this must be covered with a bell-glass; and after two days, when the earth is warm, the seeds must be sown on it, covered with a quarter of an inch of fresh earth, and the glass then set on again. The glass must be covered with a mat at night, and in four days the young plants will appear. When these are seen, the rest of the dung must be made up into a bed for one or more lights. This must be three feet thick, beat close together, and covered three inches deep with fine fresh earth; the frame must then be put on, and covered at night, or in bad weather, with mats. When the earth is hot enough, the young plants from under the bell must be removed into it, and set at two inches distance. The glasses must be now and then a little raised, to give

Cucumis.

air to the plants, and turned often, to prevent the wet from the steam of the dung from dropping down upon them. The plants must be watered at proper times; and the water used for this purpose must be set on the dung till it becomes as warm as the air in the frame: and as the young plants increase in bulk, they must be earthed up, which will give them great additional strength. If the bed is not hot enough, some fresh litter should be laid round its sides; and if too hot, some holes should be bored into several parts of it with a stake, which will let out the heat; and when the bed is thus brought to a proper coolness, the holes are to be stopped up again with fresh dung. When these plants begin to shoot their third, or rough leaf, another bed must be prepared for them like the first; and when it is properly warm through the earth, the plants of the other bed must be taken up, and planted in this, in which there must be a hole in the middle of each light, about a foot deep, and nine inches over, filled with light and fine fresh earth laid hollow in form of a basin: in each of these holes there must be set four plants: these must be, for two or three days, shaded from the sun, that they may take firm root; after which they must have all the sun they can, and now and then a little fresh air, as the weather will permit. When the plants are four or five inches high, they must be gently pegged down towards the earth, in directions as different from one another as may be; and the branches afterwards produced should be treated in the same manner. In a month after this the flowers will appear, and soon after the rudiments of the fruit. The glasses should now be carefully covered at night; and in the daytime the whole plants should be gently sprinkled with water. These will produce fruit till about midsummer; at which time the second crop will come in to supply their place: these are to be raised in the same manner as the early crop, only they do not require so much care and trouble. This second crop should be sown in the end of March, or beginning of April. The season for sowing the cucumbers of the last crop, and for pickling, is towards the latter end of May, when the weather is settled: these are sown in holes dug to a little depth and filled up with fine earth, so as to be left in the form of a basin; eight or nine seeds being put into one hole. These will come up in five or six days, and till they are a week old, are in great danger from the sparrows. After this they require only to be kept clear of weeds, and watered now and then. There should be only five plants left at first in each hole; and when they are grown a little farther up, the worst of these is to be pulled up, that there may finally remain only four. The plants of this crop will begin to produce fruit in July.

The cucumber is taken in great cities by the lower people as nourishment; but by the better sort is chiefly used as a refrigerant, or condiment, to accompany animal food. They have a bland insipid juice, without acidity or sweetness, approaching, as appears by their ripening, to a farinaceous matter. When used green they have no nourishment, so they are only to be used in the summer season and by the sedentary. Although cucumbers are neither sweet nor acid, yet they are considerably acescent, and so produce flatu-

lency, cholera, diarrhoea, &c. Their coldness and flatulency may be likewise in part attributed to the firmness of their texture. They have been discharged with little change from the stomach, after being detained there for 48 hours. By this means, therefore, their acidity is greatly increased. Hence oil and pepper, the condiments commonly employed, are very useful to check their fermentation. We have lately used another condiment, viz. the skin, which is bitter, and may therefore supply the place of aromatics; but should only be used when young.

Besides the above-mentioned species which are proper for the table, this genus affords also two articles for the materia medica.

1. The elaterium of the shops, is the inspissated fecula of the juice of a kind of wild cucumber, called also the ass's cucumber, a species of balsam apple. It comes to this country from Spain and the southern parts of France, where the plant is very common. It is brought to us in small flat whitish lumps or cakes that are dry, and break easily between the fingers. It is of an acrid, bitter, and nauseous taste, and has a strong offensive smell when newly made: but these, as well as its other qualities it loses after being kept some time. Elaterium is a very violent purge and vomit, and is now very seldom used. The plant is commonly called spirting cucumber, from its casting out its seeds with great violence, together with the viscid juice in which they are lodged, if touched when ripe: from this circumstance it has obtained the appellation of *noli me tangere*, or "touch me not."

2. The colocynthis, the colocynth, coloquintida, or bitter apple of the shops, is brought to us from Aleppo and the island of Crete. The leaves of the plant are large, placed alternate, almost round, and stand upon footstalks four inches long. The flowers are white; and are succeeded by a fruit of the gourd kind, of the size of a large apple, and which is yellow when ripe. The shelly or hulky outside incloses a bitter pulp interspersed with flatulif seeds. If a hole is made in one of these ripe gourds, and a glass of rum poured in, and suffered to remain 24 hours, it proves a powerful purgative. The pulp itself dried and powdered is commonly used as a purgative in this country, but is one of the most drastic and disagreeable we know. If taken in a large dose, it not only often brings away blood, but produces colics, convulsions, ulcers in the bowels, and fatal super-purgations. The most effectual corrector of these virulent qualities is to triturate it finely with sugar, or sweet almonds.

CUCURBITA, the name of a chemical vessel employed in distillation, when covered with its head. Its name comes from its lengthened shape, by which it resembles a gourd: some cucurbits, however, are shallow, and wide-mouthed. They are made of copper, tin, glass, and stone-ware, according to the nature of the substances to be distilled. A cucurbit, provided with its capital, constitutes the vessel for distillation called an *alembic*. See CHEMISTRY, n° 80. and Plate LXXXVII. fig. 5. 6.

CUCURBITA, the GOURD, and POMPION; a genus of the syngenesia order, belonging to the monœcia class of plants. There are five species.

1. The lagenaria, or bottle gourd, rises with thick trailing

Cucurbit

Cucurbita.

curbata. trailing downy stalks, branching into many spreading runners. These extend along the ground sometimes 15 or 20 feet in length. The leaves are large, roundish, heart-shaped, indented, and woolly. The flowers are large and white, succeeded by long incurved whitish yellow fruit, obtaining from about two to five or six feet in length, and from about nine to 24 inches in circumference, having a ligueous and durable shell.

2. The papo or pompon, commonly called pumpkin, hath strong, trailing, rough stalks, branching into numerous runners. These are much larger than the former, extending from 10 to 40 or 50 feet each way. These are garnished with large, roundish, lobated, rough leaves, and yellow flowers. The flowers are succeeded by large, round, smooth fruit, of different forms and sizes; some as big as a peck, others as big as half a bushel measure; some considerably less, and others not exceeding the bulk of an orange; ripening to a yellow, and sometimes to a whitish, colour. This species is the most hardy of any, as well as the most extensive in their growth. A single plant, if properly encouraged, will overspread 10 or 15 roods of ground, and produce a great number of fruit, which, when young, are generally a mixture between a deep blue and pale white, but change as they increase in bulk.

3. The verrucosa, or warted gourd, hath trailing stalks very branchy, and running upon the ground 10 or 15 feet each way; large lobated leaves, and yellow flowers, succeeded by roundish, knobby, warted white fruit, of moderate size.

4. The melopepo, erect gourd, or squash. This rises with an erect strong stalk several feet high, rarely sending forth side-runners, but becoming bushy upward. It is adorned with large lobated leaves; and the flowers are succeeded by depressed knotty fruit, both white and yellow, commonly of a moderate size.

5. The lignosa, ligneous shelled gourd, often called calabash. This hath trailing stalks, branching into runners, which extend far every way; the leaves are large, lobated, and rough; the flowers yellow, and are succeeded by roundish smooth fruit of a moderate size, with hard woody shells. Of all these species there are a great many varieties, and the fruit of every species is observed to be surprisingly apt to change its form.

Culture. All the species of gourds and pompons, with their respective varieties, are raised from seed sown annually in April or the beginning of May, either with or without the help of artificial heat. But the plants forwarded in a hot-bed till about a month old, produce fruit a month or six weeks earlier on that account, and ripen proportionably sooner. The first species particularly will scarce ever produce tolerably sized fruit in this country, without the treatment above-mentioned.

Uses. In this country these plants are cultivated only for curiosity; but in the places where they are natives, they answer many important purposes. In both the Indies, bottle-gourds are very commonly cultivated and sold in the markets. They make the principal food of the common people, particularly in the warm months of June, July, and August. The Arabians call this kind of gourd *charrah*. It grows commonly on the mountains in these deserts. The na-

tives boil and season it with vinegar; and sometimes, filling the shell with rice and meat, make a kind of pudding of it. The hart shell is used for holding water, and some of them are capacious enough to contain 22 gallons; these, however, are very uncommon. The fruit of the pompon likewise constitutes a great part of the food of the common people during the hot months, in those places where they grow. If gathered when not much bigger than a hen or goose egg, and properly seasoned with butter, vinegar, &c. they make a tolerable good sauce for butcher's meat, and are also used in soups. In England they are seldom used till grown to maturity. A hole is then made in one side, through which the pulp is scooped out; after being divested of the seeds, it is mixed with sliced apples, milk, sugar, and grated nutmeg, and thus a kind of pudding is made. The whole is then baked in the oven, and goes by the name of a *pumpkin pye*. For this purpose the plants are cultivated in many places of England by the country people, who raise them upon old dung hills. The third species is also used in North America for culinary purposes. The fruit is gathered when about half grown, boiled, and eaten as sauce to butcher's meat. The squashes are also treated in the same manner, and by some people esteemed delicate eating.

CUCURBITACEÆ, the name of the 34th order in Linnæus's fragments of a natural method, consisting of plants which resemble the gourd in external figure, habit, virtues, and sensible qualities. This order contains the following genera, *viz.* *gronovia*, *melothria*, *passiflora*, *anguria*, *bryonia*, *cucumis*, *cucurbita*, *sevillea*, *momordica*, *sicyos*, *trichofanthus*.

CUCURUCU, in zoology, the name of a serpent found in America, growing 10 or 12 feet long. It is also very thick in proportion to its length, and is of a yellowish colour, strongly variegated with black spots, which are irregularly mixed among the yellow, and often have spots of yellow within them. It is a very poisonous species, and greatly dreaded by the natives; but its flesh is a very rich food, and much esteemed among them, when properly prepared.

CUD, sometimes means the inside of the throat in beasts; but generally the food that they keep there, and chew over again. See **COMPARATIVE ANATOMY**, p. 88—90.

CUDWEED, in botany. See **GNAPHALUM**.

CUDWORTH (Ralph), a very learned divine of the church of England in the 17th century. In January 1657 he was one of the persons nominated by a committee of the parliament to be consulted about the English translation of the Bible. In 1678 he published his *True Intellectual System of the Universe*; a work which met with great opposition. He likewise published a treatise, intitled, *Deus justificatus*; or, "The divine goodness of God vindicated, against the assertions of absolute and unconditionate reprobation." He embraced the mechanical or corpuscular philosophy; but with regard to the deity, spirits, genii, and ideas, he followed the Platonists. He died at Cambridge in 1688. The late earl of Shaftesbury styles him an excellent and learned divine, of highest authority at home, and fame abroad. His daughter Damaris, who married Sir Francis Masham of Oates in Essex, was a lady

*Cucurbita-
cce
i
Cudworth.*

Cuenza
Cujas.Cujava
Culm.

of genius and learning: she had a great friendship for Mr Locke, who resided several years at her house at Oates, where he died in 1704.

CUENZA, a town of Spain, in New Castile, and in the territory of the Sierra, with a bishop's see. It was taken by lord Peterborough in 1706, but retaken by the duke of Berwick. It is seated on the river Xucar, in W. Long. 1. 45. N. Lat. 40. 10.

CUFF (Henry), the unfortunate secretary of the unfortunate earl of Essex, was born at Hinton St George in Somersetshire, about the year 1560, of a genteel family, who were possessed of considerable estates in that county. In 1576, he was entered of Trinity college, Oxford; where he soon acquired considerable reputation as a Grecian, and disputant. He obtained a fellowship in the above-mentioned college; but was afterwards expelled for speaking disrespectfully of the founder*. He was, however, soon after admitted of Merton college; of which, in 1586, he was elected probationer, and, in 1588, fellow. In this year he took the degree of master of arts. Some time after, he was elected Greek professor, and, in 1594, proctor of the university.

When he left Oxford is uncertain; nor are we better informed as to the means of his introduction to the earl of Essex. When that nobleman was made lord lieutenant of Ireland, Mr Cuff was appointed his secretary, and continued intimately connected with his lordship until his confinement in the tower; and he is generally supposed to have advised those violent measures which ended in their mutual destruction. The earl indeed confessed as much before his execution, and charged him, to his face, with being the author of all his misfortunes. Mr Cuff was tried for high-treason, convicted, and executed at Tyburn on the 30th of March 1601. Lord Bacon, Sir Henry Wotton, and Camden, speak of him in very harsh terms. He was certainly a man of learning and abilities.

He wrote two books; the one intitled, *The Differences of the Ages of Man's Life*; the other, *De Rebus Gestis in Sancto Concilio Nicæno*. The first was published after his death; the second is still in manuscript.

CUJAS (James), in Latin *Cujacius*, the best civilian of his time, was born at Toulouse, of obscure parents, in 1520. He learned polite literature and history; and acquired great knowledge in the ancient laws, which he taught with extraordinary reputation at Toulouse, Cahors, Bourges, and Valence, in Dauphiné. Emanuel Philibert, duke of Savoy, invited him to Turin, and gave him singular marks of his esteem. Cujas afterwards refused very advantageous offers from pope Gregory XIII. who was desirous of having him teach at Bologna: but he chose rather to fix at Bourges, where he had a prodigious number of scholars; whom he not only took great pleasure in instructing, but assisted with his substance, which occasioned his being called the *Father of his Scholars*. He died at Bourges in 1590, aged 70. His works are in high esteem among civilians.

* The founder of Trinity college was Sir Thomas Pope, who, it seems, would often take a piece of plate from a friend's house, and carry it home, concealed under his gown; out of fun, no doubt. Cuff, being merry with some of his acquaintance at another college, happened to say, alluding to Sir Thomas Pope's usual joke above mentioned, "A pox on this beggarly house! why, 'our founder stole as much plate as would build such another.'" This piece of wit was the cause of his expulsion. The heads of colleges in those days did not understand humour. Anthony Wood was told this story by doctor Bathurst.

CUJAVA, a territory of Great Poland, having on the north the duchy of Prussia, on the west the palatinate of Kalisz, on the south those of Lici and Rawa, and on the west that of Plocko. It contains two palatinates, the chief towns of which are Inowloz and Brest; as also Uladslaw, the capital of the district.

CUIRASSE, a piece of defensive armour, made of iron plate, well hammered, serving to cover the body, from the neck to the girdle, both before and behind. Whence,

CUIRASSIERS, cavalry armed with cuirasses, as most of the Germans are: the French have a regiment of cuirassiers; but we have had none in the British army since the revolution.

CULDEES, in church-history, a sort of monkish priests, formerly inhabiting Scotland and Ireland. Being remarkable for the religious exercises of preaching and praying, they were called, by way of eminence, *cultores Dei*; from whence is derived the word *culdees*. They made choice of one of their own fraternity to be their spiritual head, who was afterwards called the *Scots bishop*.

CULEUS, in Roman antiquity, the largest measure of capacity for things liquid, containing 20 amphoræ, or 40 urnæ. It contained 143 gallons, 3 pints, English wine-measure; and was 11.095 solid inches.

CULEMBACH, a district or marquise of the circle of Franconia, in Germany. It is bounded on the west by the bishopric of Bamberg; on the south by the territory of Nuremberg; on the east by the palatinate of Bavaria and Bohemia; and on the north by Voightland and part of the circle of Upper Saxony. It is about 50 miles in length from north to south, and 30 in breadth from east to west. It is full of forests and high mountains; the most considerable of the latter are those of Frichtelberg, all of them covered with pine-trees. Here are the sources of four large rivers, the Maine, the Sala, the Eger, and the Nab. This marquise is the upper part of the burgraviat of Nuremberg.

CULEMBACH, a town of Germany, in Franconia, the capital of the marquise of the same name. It has good fortifications, and is seated at the confluence of two branches of the river Maine. It was pillaged and burnt by the Hussites in 1430, and by the inhabitants of Nuremberg in 1573. E. Long. 11. 28. N. Lat. 50. 12.

CULIACAN, a province of North America, in the audience of Cudalajara. It is bounded on the north by New Mexico, on the east by New Biscay and the Zacatecas, on the south by Chiametlan, and on the west by the sea. It is a fruitful country, and has rich mines.

CULLIAGE, a barbarous and immoral practice, whereby the lords of manors anciently assumed a right to the first night of their vassals' brides.

CULLEN, a parliament town in Scotland, situated on the sea-coast of Banff-shire. W. Long. 2. 12, and N. Lat. 57. 38.

CULM, or CULMUS, among botanists, a straw, or haulm;

Culmiferous.
Culverin.

haulm; defined by Linnaeus to be the proper trunk of the grasses, which elevates the leaves, flower, and fruit.

This sort of trunk is tubular, or hollow, and has frequently knots, or joints, distributed at proper distances through its whole length. The leaves are long, sleek, and placed either near the root in great numbers, or proceed singly from the different joints of the stalk, which they embrace at the base, like a sheath, or glove.

The haulm is commonly garnished with leaves: sometimes, however, it is naked; that is, devoid of leaves, as in a few species of cyperis-grass. Most grasses have a round cylindrical stalk; in some species of *sclærus*, *scirpus*, cyperis-grass, and others, it is triangular.

The stalk is sometimes entire, that is, has no branches; sometimes branching, as in *sclærus aculeatus* & *capensis*; and not seldom consists of a number of scales, which lie over each other like tiles.

Lastly, in a few grasses, the stalk is not interrupted with joints, as in the greater part. The space contained betwixt every two knots, or joints, is termed by botanists *internodium*, and *articulus culmi*.

This species of trunk often affords certain marks of distinction, in discriminating the species. Thus in the genus *ericaulon*, the species are scarce to be distinguished but by the angles of the culmus, or stalks. There in some species are in number 5, in others 6, and in others 10.

CULMIFEROUS PLANTS, (from *culmus*, a straw or haulm): plants so called, which have a smooth jointed stalk, usually hollow, and wrapped about at each joint with single, narrow, sharp-pointed leaves, and the seeds contained in chaffy husks; such are oats, wheat, barley, rye, and the other plants of the natural family of the GRASSES.

CULMINATION, in astronomy, the passage of any heavenly body over the meridian, or its greatest altitude for that day.

CULPRIT, a term used by the clerk of the arraignments, when a person is indicted for a criminal matter. See *PLEA to Indictment*, par. 11.

CULROSS, a parliament town in Scotland, situated on the river Forth, about 23 miles north-west of Edinburgh. W. Long. 3. 34. N. Lat. 56. 8.

CULVERIN, a long slender piece of ordnance or artillery, serving to carry a ball to a great distance. Menage derives the word from the Latin *culubrina*; others from *culuber*, snake; either on account of the length and slenderness of the piece, or of the ravages it makes.

There are three kinds of culverins, *viz.* the extraordinary, the ordinary, and the least sized. 1. The culverin extraordinary has $5\frac{1}{2}$ inches bore; its length 32 calibers, or 13 foot; weighs 4800 pound; its load above 12 pound; carries a shot $5\frac{1}{2}$ inches diameter, weighing 20 pound weight. 2. The ordinary culverin is 12 foot long; carries a ball of 17 pound 5 ounces; caliber $5\frac{1}{2}$ inches; its weight 4500 pound. 3. The culverin of the least size, has its diameter 5 inches; is 12 foot long; weighing about 4000 pounds; carries a shot $3\frac{1}{2}$ inches diameter, weighing 14 pounds 9 ounces.

VOL. III

Culvert-tailed
Cuminum.

CULVERTAILED, among shipwrights, signifies the fastening or letting of one timber into another, so that they cannot slip out, as the corlings into the beams of a ship.

CUMBERLAND, **CUMBRIA**, so denominated from the *Cumri* or Britons who inhabited it; one of the most northerly counties in England. It was formerly a kingdom extending from the vallum of Adrian to the city of Dunbriton, now Dumbarton, on the frith of Clyde in Scotland. At present it is a county of England, which gives the title of *duke* to one of the royal family. It is bounded on the north and north-west by Scotland; on the south and south-east by part of Lancashire and Westmoreland; it borders on the east with Northumberland and Durham; and on the west is washed by the Irish sea. The length from north to south may amount to 55 miles, but the breadth does not exceed 40. It is well watered with rivers, lakes, and fountains; but none of its streams are navigable. In some places there are very high mountains. The air is keen and piercing on these mountains towards the north; and the climate is moist, as in all hilly countries. The soil varies with the face of the country; being barren on the moors and mountains, but fertile in the vallies and level ground bordering on the sea. In general the eastern parts of the shire are barren and desolate; yet even the least fertile parts are rich in metals and minerals. The mountains of Copland abound with copper: veins of the same metal, with a mixture of gold and silver, were found in the reign of queen Elizabeth among the fells of Derwent; and royal mines were formerly wrought at Kewick. The county produces great quantities of coal; some lead; abundance of the mineral earth called *black-lead*; several mines of lapis calaminaris; and an inconsiderable pearl-fishery on the coast near Ravenglafs.

CUMBERLAND (Richard), a very learned English divine in the latter end of the 17th century, was son of a citizen of London, and educated at Cambridge. In 1672, he published his excellent "Treatise of the Laws of Nature;" and in 1686, "An Essay toward the Jewish Weights and Measures." After the revolution he was nominated by king William to the bishopric of Peterborough, without the least solicitation on his part. He pursued his studies to the last; and the world is obliged to him for clearing up several difficulties in history, chronology, and philosophy. After the age of 83, he applied himself to the study of the Coptic language, of which he made himself master. He was as remarkable for humility of mind, benevolence of temper, and innocence of life, as for his extensive learning. He died in 1718.

CUMINUM, **CUMIN**, a genus of the digynia order, belonging to the pentandria class of plants. There is but one species, *viz.* the cyminum. It is an annual plant, perishing soon after the seed is ripe. It rises 9 or 10 inches high in the warm countries where it is cultivated; but seldom rises above four in this country. It has sometimes flowered very well here, but never brings its seeds to perfection. The leaves are divided into long narrow segments, like those of fennel, but much smaller: they are of a deep green, and generally turned backward at their extremity: the flowers grow

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Cuneus in small umbels at the top of the stalks; they are composed of five unequal petals, of a pale bluish colour, which are succeeded by long, channelled, aromatic seeds. The plant is propagated for sale in the island of Malta. In this country the seeds must be sown in small pots, and plunged in a very moderate hot-bed to bring up the plants. These, after having been gradually inured to the open air, turned out of the pots, and planted in a warm border of good earth, preserving the balls of earth to their roots, will flower pretty well, and may perhaps even perfect a few seeds in warm seasons. These seeds have a bitterish warm taste, accompanied with an aromatic flavour, not of the most agreeable kind. They are accounted good carminatives; but not very often made use of. An essential oil of them is kept in the shops.

CUNEUS (Peter), born in Zealand, in 1586, was distinguished by his knowledge in the learned languages, and his skill in the Jewish antiquities. He also studied law, which he taught at Leyden, in 1615; and read politics there till his death, in 1638. His principal work is a treatise, in Latin, on the Republic of the Hebrews.

CUNEIFORM, in general, an appellation given to whatever resembles a wedge.

CUNEIFORM-Bone, in anatomy, the seventh bone of the cranium, called also *os basilare*, and *os sphenoides*. See **ANATOMY**, n° 15.

CUNEUS, in antiquity, a company of infantry drawn up in form of a wedge, the better to break through the enemy's ranks.

CUNICULUS, in zoology. See **LEPUS**.

CUNICULUS, in mining, a term used by authors in distinction from *puteus*, to express the several sorts of passages and cuts in these subterranean works. The *cuniculi* are those direct passages in mines where they walk on horizontally; but the *putei* are the perpendicular cuts or descents. The miners in Germany call these by the name *stollen*, and *schachts*; the first word expressing the horizontal, and the second the perpendicular cuts.

CUNILA, in botany, a genus of the monogynia order, belonging to the diandria class of plants. There are three species, none of which has any remarkable property.

CUNITZ (Mary), one of the greatest geniuses in the 16th century, was born in Silesia. She learned languages with amazing facility; and understood Polish, German, French, Italian, Latin, Greek, and Hebrew. She attained a knowledge of the sciences with equal ease: she was skilled in history, physics, poetry, painting, music, and playing upon instruments; and yet these were only an amusement. She more particularly applied herself to the mathematics, and especially to astronomy, which she made her principal study, and was ranked in the number of the most able astronomers of her time. Her Astronomical Tables acquired her a prodigious reputation: she printed them in Latin and German, and dedicated them to the emperor Ferdinand III. She married Elias de Lewin, M. D.; and died at Piffen, in 1664.

CUNNINGHAM, one of the four bailiwicks in Scotland; and one of the three into which the shire of Air

is sub-divided. It lies north-east of Kyle. Its chief town is Irwin.

CUOGOLO, in natural history, the name of a stone much used by the Venetians in glass-making, and found in the river Fesino. It is a small stone of an impure white, of a flattery texture, and is of the shape of a pebble.

CUP, a vessel of capacity of various forms and materials, chiefly to drink out of. In the Ephem. German. we have a description of a cup made of a common pepper-corn by Oswald Nerlinger; which holds 1200 other ivory cups, having each its several handle, all gilt on the edges; with room for 400 more.

CUP-Galls, in natural history, a name given, by authors, to a very singular kind of galls found on the leaves of the oak, and some other trees. They are of the figure of a cup, or drinking-glass, without its foot, being regular cones adhering by their point or apex to the leaf; and the top or broad part is hollowed a little way, so that it appears like a drinking-glass with a cover, which was made so small as not to close it at the mouth, but fall a little way into it. This cover is flat, and has in the centre a very small protuberance, resembling the nipple of a woman's breast. This is of a pale green, as is also the whole of the gall, excepting only its rim that runs round the top: this is of a scarlet colour, and that very beautiful. Besides this species of gall, the oak leaves furnish us with several others, some of which are oblong, some round, and others flattened; these are of various sizes, and appear on the leaves at various seasons of the year. They all contain the worm of some small fly; and this creature passes all its changes in this its habitation, being sometimes found in the worm, sometimes in the nymph, and sometimes in the fly-state, in the cavity of it.

CUPANIA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants. There is but one species, a native of America, and which possesses no remarkable property.

CUPEL, in metallurgy, a small vessel which absorbs metallic bodies when changed by fire into a fluid scoria; but retains them as long as they continue in their metallic state. One of the most proper materials for making a vessel of this kind is the ashes of animal bones; there is scarcely any other substance which so strongly resists vehement fire, which so readily imbibes metallic scoriz, and which is so little disposed to be vitrified by them. In want of these, some make use of vegetable ashes freed, by boiling in water from their saline matter, which would cause them melt in the fire.

The bones, burnt to perfect whiteness, so as that no particle of coaly or inflammable matter may remain in them, and well washed from filth, are ground into moderately fine powder; which, in order to its being formed into cupels, is moistened with just as much water as is sufficient to make it hold together when strongly pressed between the fingers; some direct glutinous liquids, as whites of eggs, or gum-water, in order to give the powder a greater tenacity: but the inflammable matter, however small in quantity, which accompanies these fluids, and cannot be easily burnt out from the internal part of the mass, is apt to revive

CUOGOLA
Cupel.

Cupellation

a part of the metallic scoria that has been absorbed, and to occasion the vessel to burst or crack. The cupel is formed in a brass ring, from three quarters of an inch to two inches diameter, and not quite so deep, placed upon some smooth support: the ring being filled with moistened powder, which is pressed close with the fingers; a round-faced pestle called a *monk*, is struck down into it with a few blows of a mallet, by which the mass is made to cohere, and rendered sufficiently compact, and a shallow cavity formed in the middle: the figure of the cavity is nearly that of a sphere, that a small quantity of metal melted in it, may run together into one bead. To make the cavity the smoother, a little of the same kind of ashes levigated into an impalpable powder, and not moistened is commonly sprinkled on the surface, through a small fine sieve, made for this purpose, and the monk again struck down upon it. The ring, or mould, is a little narrower at bottom than at top; so that by pressing it down on some of the dry powder spread upon a table, the cupel is loosened, and forced upwards a little; after which it is easily pushed out with the finger, and is then set to dry in a warm place free from dull.

CUPELLATION, the act of refining gold or silver by means of a cupel. For this purpose another vessel, called a *muffle* is made use of, within which one or more cupels are placed*. The muffle is placed upon a grate in a proper furnace, with its mouth facing the door, and as close to it as may be. The furnace being filled up with fuel, some lighted charcoal is thrown on the top, and what fuel is afterwards necessary, is supplied through a door above. The cupels are set in the muffle; and being gradually heated by the successive kindling of the fuel, they are kept red-hot for some time, that the moisture which they strongly retain may be completely dissipated: for if any vapours should issue from them after the metal is put in, they would occasion it to sputter, and a part of it to be thrown off in little drops. In the sides of the muffle are some perpendicular slits, with a knob over the top of each, to prevent any small pieces of coals or ashes from falling in. The door, or some apertures made in it, being kept open, for the inspection of the cupels, fresh air enters into the muffle, and passes off through these slits; by laying some burning charcoal, on an iron plate before the door, the air is heated before its admission; and by removing the charcoal or supplying more, the heat in the cavity of the muffle may be somewhat diminished or increased more speedily than can be effected by suppressing or exciting the fire in the furnace on the outside of the muffle. The renewal of the air also is necessary for promoting the scorification of the lead.

The cupel being of a full red heat, the lead cast into a smooth bullet, that it may not scratch or injure the surface, is laid lightly in the cavity: it immediately melts; and then the gold or silver to be cupelled are cautiously introduced either by means of a small iron ladle, or by wrapping them in paper, and dropping them on the lead with a pair of tongs. The quantity of lead should be at least three or four times that of the fine metal: but when gold is very impure, it requires 10 or 12 times its quantity of lead for cupellation. It is reckoned that copper requires for its

scorification about 10 times its weight of lead; that when copper and gold are mixed in equal quantities, the copper is so much defended by the gold as not to be separable with less than 20 times its weight of lead; and that when copper is in very small proportion, as a 20th or 30th part of the gold or silver, upwards of 60 parts of lead are necessary for one of the copper. The cupel must always weigh at least half as much as the lead and copper; for otherwise it will not be sufficient for receiving half the scoria: there is little danger, however, of cupels being made too small for the quantity of a gold alloy.

The mixture being brought into thin fusion, the heat is to be regulated according to the appearances; and in this consists the principal nicety in the operation. If a various coloured skin rises to the top, which liquefying, runs off to the sides, and is there absorbed by the cupel, visibly staining the parts it enters; if a fresh scoria continually succeeds, and is absorbed nearly as fast as it is formed, only a fine circle of it remaining round the edge of the metal; if the lead appears in gentle motion, and throws up a fume a little way from its surface; the fire is of the proper degree, and the process goes on successfully.

Such a fiery brightness of the cupel as prevents its colour from being distinguished, and the fumes of the lead rising up almost to the arch of the muffle, are marks of too strong a heat: though it must be observed that the elevation of the fumes is not always in proportion to the degree of heat; for if the heat greatly exceeds the due limits, both the fumes and ebullition will entirely cease. In these circumstances the fire must necessarily be diminished: for while the lead boils and smokes vehemently, its fumes are apt to carry off some part of the gold; the cupel is liable to crack from the hasty absorption of the scoria, and part of the gold and silver is divided into globules, which lying discontinued on the cupel after the process is finished, cannot easily be collected: if there is no ebullition or fumes, the scorification does not appear to go on. Too weak a heat is known by the dull redness of the cupel; by the fume not rising from the surface of the lead; and the scoria like bright drops in languid motion, or accumulated, or growing consistent all over the metal. The form of the surface affords also an useful mark of the degree of heat; the stronger the fire, the more convex is the surface, and the weaker, the more flat: in this point, however, regard must be had to the quantity of metal; a large quantity being always flatter than a small one in an equal fire.

Towards the end of the process, the fire must be increased; for, greatest part of the fusible metal lead, being now worked off, the gold and silver will not continue melted in the heat that was sufficient before. As the last remains of the lead are separating, the rainbow colours on the surface become more vivid, and variously intersect one another with quick motions. Soon, after, disappearing all at once, a sudden luminous brightness of the button of gold and silver shews the process to be finished. The cupel is then drawn forwards towards the mouth of the muffle; and the button, as soon as grown fully solid taken out.

CUPELLING FURNACE. See *Cupelling Furnace*.

Cupellation

Cupelling.

* See
Muffle.

Cupid
Cupressus.

CUPID, in pagan mythology, the god of love. There seem to have been two Cupids; the one the son of Jupiter and Venus, whose delight it was to raise sentiments of love and virtue; and the other the son of Mars and the same goddess, who inspired base and impure desires. The first of these, called Eros, bore golden arrows, which caused real joy, and a virtuous affection; the other, called Anteros, had leaden arrows that raised a passion founded only on desire, which ended in satiety and disgust. Cupid was always drawn with wings, to represent his inconstancy; and naked, to shew that he has nothing of his own. He was painted blind, to denote that love sees no fault in the object beloved; and with a bow and quiver of arrows, to shew his power over the mind. Sometimes he is placed between Hercules and Mercury, to shew the prevalence of eloquence and valour in love; and at others is placed near Fortune, to signify that the success of lovers depends on that inconstant goddess. Sometimes he is represented with an helmet on his head, and a spear on his shoulder, to signify that love disarms the fiercest men; he rides upon the backs of panthers and lions, and uses their manes for a bridle, to denote that love tames the most savage beasts. He is likewise pictured riding upon a dolphin, to signify, that his empire extends over the sea, no less than the land.

CUPOLA, in architecture, a spherical vault, or the round top of the dome of a church, in the form of a cup inverted.

CUPPING, in surgery, the operation of applying cupping-glasses for the discharge of blood and other humours by the skin. See **SURGERY**.

CUPRESSUS, the **CYPRESS-TREE**; a genus of the monadelphia order, belonging to the monœcia class of plants. There are six species; the most remarkable are the following: 1. The sempervirens, with an upright straight stem, closely branching all around, almost from the bottom upwards, into numerous quadrangular branches; rising in the different varieties from 15 to 40 or 50 feet in height, and very closely garnished with small, narrow, erect evergreen leaves, placed imbricately; and flowers and fruit from the sides of the branches. 2. The thuyoides, or evergreen American cypress, commonly called white cedar, hath an upright stem, branching out into numerous two-edged branches, rising 20 or 30 feet high, ornamented with flat ever-green leaves imbricated like arbor vitæ, and small blue cones the size of juniper-berries. 3. The disticha, or deciduous American cypress, hath an erect trunk, retaining a large bulk, branching wide and regular; grows 50 or 60 feet high, fully garnished with small, spreading deciduous leaves, arranged distichous, or along two sides of the branches. All these species are raised from seeds, and will sometimes also grow from cuttings; but those raised from seeds prove the handsomest plants. The seeds are procured in their cones from the seedmen, and by exposing them to a moderate heat, they readily open, and discharge the seeds freely. The season for sowing them is any time in March; and they grow freely on a bed or border of common light earth; especially the first and third species. The ground must then be dug, well broken, and raked smooth, then drawing an inch of earth

evenly from off the surface into the alley, sow the seeds moderately thick, and directly sift the earth over them, half an inch deep. If in April and May the weather proves warm and dry, a very moderate watering will now and then be necessary, and the plants will rise in six or eight weeks. During the summer they must be kept clear from weeds, and in dry weather they must be gently watered twice a week. In winter they must be occasionally sheltered with mats in the time of hard frost. In two years they will be fit for transplanting from the seed-bed, when they may be set in nursery-rows two feet asunder; and in three or four years they will be fit for the shrubbery.

The wood of the first species is said to resist worms, moths, and putrefaction, and to last many centuries. The coffins in which the Athenians were wont to bury their heroes were made, says Thucydides, of this wood; as were likewise the chests containing the Egyptian mummies. The doors of St Peter's church at Rome were originally of the same materials. These, after lasting upwards of 600 years, at the end of which they did not discover the smallest tendency to corruption, were removed by order of pope Eugenius IV. and gates of brass substituted in their place. The same tree is by many eminent authors recommended as improving and meliorating the air by its balsamic and aromatic exhalations; upon which account many ancient physicians of the eastern countries used to send their patients who were troubled with weak lungs to the island of Candia, where these trees grew in great abundance; and where, from the salubrious air alone, very few failed of a perfect cure. In the same island, says Miller, the cypress trees were so lucrative a commodity, that the plantations were called *dei filii*; the selling of one of them being reckoned a daughter's portion. Cypress, says Mr Pococke, is the only tree that grows towards the top of mount Lebanon, and being nipped by the cold, grows like a small oak. Noah's ark is commonly supposed to have been made of this kind of wood.

CUPRUM AMMONIACALE. See **CHEMISTRY**, n° 332. This preparation is recommended in some kinds of spasmodic diseases, given in the dose of one or two grains.

CUPRUM, or **COPPER**. See **COPPER**.

CURACOA, or **CURASSOW**, one of the larger Antilles islands, subject to the Dutch; situated in W. Long. 68. 30 N. Lat. 12. 30. This island is little else than a bare rock, about ten leagues long, and five broad; lying three leagues off the coast of Venezuela. It has an excellent harbour, but the entrance is difficult. The basin is extremely large, and convenient in every respect; and is defended by a fort skillfully constructed, and always kept in repair. The reason of forming a settlement upon this barren spot was to carry on a contraband trade with the Spanish colonies on the continent; but after some time the method of managing this trade was changed. Curassow itself became an immense magazine, to which the Spaniards resorted in their boats to exchange gold, silver, vanilla, cocoa, cochineal, bark, skins and mules, for negroes, linen, silks, India stuffs, spices, laces, ribbands, quick-silver, steel, and iron-ware. These voyages, though continual, did not prevent a number of Dutch
sloops

Cupressus
Curacoë.

Curate
|
Curb.

floops from passing from Curassow to the continent. But the modern substitution of register-ships instead of galleons, has made this communication less frequent; but it will be revived whenever, by the intervention of war, the communication with the Spanish main shall be cut off. The disputes between the courts of London and Versailles also prove favourable to the trade of Curassow. At these times it furnishes provisions to the southern parts of St Domingo, and takes off all its produce. Even the French privateers, from the windward islands, repair in great numbers to Curassow, notwithstanding the distance. The reason is, that they find there all kinds of necessary stores for their vessels; and frequently Spanish, but always European goods, which are universally used. English privateers seldom cruise in these parts. Every commodity without exception, that is landed at Curassow, pays one *per cent.* port-duty. Dutch goods are never taxed higher: but those that are shipped from other European ports pay nine *per cent.* more. Foreign coffee is subject to the same tax, in order to promote the sale of that of Surinam. Every other production of America is subject only to a payment of three *per cent.*; but with an express stipulation that they are to be conveyed directly to some port belonging to the republic.

CURATE, the lowest degree in the church of England; he who represents the incumbent of a church, parson or vicar, and officiates divine service in his stead: and in case of pluralities of livings, or where a clergyman is old and infirm, it is requisite there should be a curate to perform the cure of the church. He is to be licensed and admitted by the bishop of the diocese, or by an ordinary having episcopal jurisdiction: and when a curate hath the approbation of the bishop, he usually appoints the salary too; and in such case, if he be not paid, the curate hath a proper remedy in the ecclesiastical court, by a sequestration of the profits of the benefice; but if the curate is not licensed by the bishop, he is put to his remedy at common law, where he must prove the agreement, &c. A curate having no fixed estate in his curacy, not being instituted and inducted, may be removed at pleasure by the bishop or incumbent. But there are perpetual curates as well as temporary, who are appointed where tithes are inappropriate, and no vicarage endowed: these are not removable, and the proprietors are obliged to find them, some whereof have certain portions of the tithes settled on them. Every clergyman that officiates in a church, (whether incumbent or substitute), in the liturgy is called a *curate*. Curates must subscribe the declaration according to the act of uniformity, or are liable to imprisonment, &c.

CURATOR, among civilians, a person regularly appointed to manage the affairs of minors, or persons mad, deaf, dumb, &c. See LAW.

CURB, in the menage, a chain of iron, made fast to the upper part of the branches of the bridle in a hole called the *eye*, and running over the horse's beard. It consists of these three parts; the hook, fixed to the eye of the branch; the chain of SS's or links; and the two rings, or mails. Large curbs, provided they be round, are always most gentle: but care is to be taken, that it rest in its proper place, a little above

the beard, otherwise the bit-mouth will not have the effect that may be expected from it.

English watering bits have no curbs; the Turkish bits, called *genettes*, have a ring that serves instead of a curb. See GENETTES.

CURB, in farriery. See there, § xxviii. 1.

CURCAS, a name given in Egypt to an esculent root, approaching to the taste and virtues of the colocasia. It is also a name used in Malabar for a small fruit of the shape and size of an hazel nut. Both these things have the credit of being strong provocatives; and it is very probable that the curcas of the East Indies may be the fruit called *bel* by Avicenna, and said to possess the same virtues. Garcias has been led into a very great error by this similarity of names and virtues; and supposes the curcas of Egypt the same with that of the East Indies.

CURCULLIO, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are subclavated, and rest upon the snout, which is prominent and horny. There are no less than ninety-five species, principally distinguished by their colour.

CURCUMA, TURMERIC; a genus of the monogynia order, belonging to the monandria class of plants. The species are,

1. The rotunda, with a round root, hath a fleshy-jointed root like that of ginger, but rounder; which sends up several spear-shaped oval leaves, which rise upwards of a foot high, and of a sea-green colour. From between these arises the flower-stalk, supporting a loose spike of flowers of a pale-yellowish colour, inclosed in several different spathe, or sheaths, which drop off. The flowers are never succeeded by seeds in this country. 2. The longa, hath long fleshy roots of a deep yellow colour, which spread under the surface of the ground like those of ginger; they are about the thickness of a man's finger, having many round knotty circles, from which arise four or five large spear-shaped leaves, standing upon long foot-stalks. The flowers grow in loose scaly spikes on the top of the foot-stalks, which arise from the larger knobs of the roots, and grow about a foot high; they are of a yellowish-red colour, and shaped somewhat like those of the Indian reed.

These plants grow naturally in India, from whence the roots are brought to Europe for use. They are very tender; so will not live in this country unless kept constantly in a stove. They are propagated by parting the roots. The root communicates a beautiful but perishable yellow dye, with alum, to woolen, cotton, or linen. In medicine it is esteemed aperient, and emmenagogue; and of singular efficacy in the jaundice.

CURDISTAN, a country of Asia, seated between the Turkish empire and Persia, lying along the eastern coast of the river Tigris, and comprehends great part of the ancient Assyria. Some of the inhabitants live in towns and villages, and others rove from place to place, having tents like the wild Arabs, and are also robbers like them. Their religion is partly Christian, and partly Mahometanism; but they are very loose in regard to either.

CURDLING, the coagulating any fluid body, especially milk.

It is said, that at Florence they curdle their milk
for

Curb
|
Curdling.

Curètes
Curia.

for the making of cheese with artichoke-flowers, instead of the rennet used among us for that purpose.

CURETES, in antiquity, a sort of priests, or people, of the isle of Crete; called also *Corybantes*. See *CORYBANTES*, and *CRETE*. The Curetes are said to have been originally of mount Ida, in Phrygia; for which reason they were also called *idæi dactyli*. See *DACTYLI*.

Lucian and Diodorus Siculus represent them as very expert in casting of darts; though other authors give them no weapons but bucklers and pikes: but all agree in furnishing them with tabors, and castanets; and relate that they used to dance much to the noise and clashing thereof. By this noise, it is said they prevented Saturn from hearing the cries of young Jupiter, whereby he was saved from being destroyed.

Some authors, however, give a different account of the Curetes: according to Pezron, and others, the Curetes were, in the times of Saturn, &c. and in the countries of Crete and Phrygia, what the druids were afterwards among the Gauls, &c. i. e. they were priests who had the care of what related to religion, and the worship of the gods.

Hence, as in those days it was supposed there was no communication with the gods but by divinations, auguries, and the operations of magic; the Curetes passed for magicians and enchanters: to these they added the study of the stars, of nature, and poetry; and so were philosophers, astronomers, &c.

Vossius, *de Idolat.* distinguishes three kinds of Curetes; those of Ætolia, those of Phrygia, and those of Crete who were originally derived from the Phrygians. The first, he says, took their name from *κρηται*, *tonsure*; in regard, from the time of a combat wherein the enemy seized their long hair, they always kept it cut: those of Phrygia and Crete, he supposes, were so called from *κρηται*, *young man*; in regard they were young, or because they nursed Jupiter when he was young.

CURFEW, or **COURFEW**, a signal given in cities taken in war, &c. to the inhabitants to go to bed. Pasquin says, it was so called, as being intended to advertise the people to secure themselves from the robberies and debaucheries of the night.

The most eminent curfew in England was that established by William the Conqueror, who appointed, under severe penalties, that, at the ringing of a bell at eight o'clock in the evening, every one should put out their lights and fires, and go to bed: whence, to this day, a bell rung about that time is called a *curfew-bell*.

CURIA, in Roman antiquity, was used for the senate-house. There were several curiæ in Rome; as the *curia calabra* said to be built by Romulus, the *curia hostilia* by Tullus Hostilius, and the *curia pompeia* by Pompey the Great.

CURIA, also denoted the places where the curiæ used to assemble. Each of the 30 curiæ of old Rome had a temple or chapel assigned to them for the common performance of their sacrifices, and other offices of their religion; so that they were not unlike our parishes. Some remains of these little temples seem to have subsisted many ages after on the Palatine hill,

where Romulus first built the city, and always resided.

CURIA, among the Romans, also denoted a portion, or division of a tribe. In the time of Romulus, a tribe consisted of ten curiæ, or a thousand men; each curia being one hundred: that legislator made the first division of his people into thirty curiæ. Afterwards, *curia*, or *domus curialis*, became used for the place where each curia held its assemblies. Hence, also, curia passed to the senate-house; and it is from hence the moderns come to use the word *curia*, court, for a place of justice, and for the judges, &c. there assembled.

CURIA, in our ancient customs.—It was usual for the kings of England to summons the bishops, peers, and great men of the kingdom, to some particular place, at the chief festivals in the year: and this assembly is called, by our historians, *curia*; because there they consulted about the weighty affairs of the nation: whence it was sometimes also called, *solemnis curia*, *generalis curia*, *augustalis curia*, and *curia publica*, &c. See *WITENA-MOT*.

CURIA Baronum. See *COURT-Baron*.

CURIA Claudenda, is a writ that lies against him who should fence and enclose the ground, but refuses or defers to do it.

CURIATII, three brothers of Alba, maintained the interest of their country against the Romans who had declared war against those of Alba. The two armies being equal, three brothers on each side were chosen to decide the contest: the Curiatii by those of Alba, and the Horatii by the Romans. The three first were wounded, and two of the latter killed: but the third, joining policy to valour, ran away; and having thus tired the curiatii, he took them one after another and killed them all three.

CURING, a term used for the preserving fish, flesh, and other animal substances, by means of certain additions of things, to prevent putrefaction. One great method of doing this, is by smoking the bodies with the smoke of wood, or rubbing them with salt, nitre, &c.

CURLEW, in ornithology. See *SCOLOPAX*.

CURNOCK, a measure of corn, containing four bushels, or half a quarter.

CURMI, a name given by the ancients to a sort of malt liquor or ale. It was made of barley, and was drunk by the people of many nations instead of wine, according to Dioscorides's account: he accuses it of causing pains in the head, generating bad juices, and disordering the nervous system. He also says, that in the western part of Iberia, and in Britain, such a sort of liquor was in his time prepared from wheat instead of barley. See *ALE*.

CURRANS, or **CURRENTS**, the fruit of a species of grossularia. See *GROSSULARIA*.

The white and red sort are mostly used; for the black, and chiefly the leaves, upon first coming out, are in use to flavour English spirits, and counterfeit French brandy. Currants greatly assuage drought, cool, and fortify the stomach, and help digestion; and the jelly of black currants is said to be very efficacious in curing inflammations of the throat.

CURRENTS, also signify a smaller kind of grapes, brought

Curia
Currants.

current.

brought principally from Zant and Cephalonia. They are gathered off the buffies, and laid to dry in the sun, and to put up in large butts. They are opening and pectoral; but are more used in the kitchen, than in medicine.

CURRENT, in navigation, a certain progressive movement of the water of the sea, by which all bodies floating therein are compelled to alter their course, or velocity, or both, and submit to the laws imposed on them by the current.

In the sea, currents are either natural and general, as arising from the diurnal rotation of the earth about its axis; or accidental and particular, caused by the waters being driven against promontories, or into gulphs and straits, where, wanting room to spread, they are driven back, and thus disturb the ordinary flux of the sea. Currents are various, and directed towards different parts of the ocean, of which some are constant, other periodical. The most extraordinary current of the sea, is that by which part of the Atlantic or African ocean moves about Guinea from Cape Verd towards the Curvature or bay of Africa, which they call *Fernando Poo*; viz. from west to east, contrary to the general motion. And such is the force of the current, that when ships approach too near the shore, it carries them violently towards that bay, and deceives the mariners in their reckoning. There is a great variety of shifting currents which do not last, but return at certain periods; and these do, most of them, depend upon and follow the anniverary winds or monsoons, which by blowing in one place may cause a current in another. Varenus informs us, that at Java, in the streights of Sunda, when the monsoons blow from the west, viz. in the month of May, the currents set to the eastward, contrary to the general motion. Between the island of Celebes and Madura, when the western monsoons set in, viz. in December, January, and February, or when the winds blow from the north-west, or between the north and west, the currents set to the south-east, or between the south and east. At Ceylon, from the middle of March to October, the currents set to the southward, and in the other parts of the year to the northward: because at this time the southern monsoons blow, and at the other the northern. Between Cochín China and Malacca, when the western monsoons blow, viz. from April to August, the currents set eastward against the general motion; but the rest of the year they set westward; the monsoon conspiring with the general motion. They run so strongly in these seas, that unexperienced sailors mistake them for waves that beat upon the rocks, known usually by the name of *breakers*. So for some months after the 15th of February, the currents set from the Maldives towards India on the east, against the general motion of the sea. On the shore of China and Cambodia, in the months of October, November, and December, the currents set to the north-west, and from January to the south-west, when they run with such rapidity about the shoals of Parcel, that they seem swifter than an arrow. At Pulo Condore, upon the coast of Cambodia, though the monsoons are shifting, yet the currents set strongly towards the east, even when they blow to a contrary point. Along the coasts

of the bay of Bengal, as far as the Cape Romania, at the extreme point of Malacca, the current runs southward in November and December. When the monsoons blow from China to Malacca, the sea runs swiftly from Pulo Cambi to Pulo Condore on the coast of Cambodia. In the bay of Sans Bras, not far from the Cape of Good Hope, there is a current particularly remarkable, where the sea runs from east to west to the landward; and this more vehemently as it is opposed by winds from a contrary direction. The cause is undoubtedly owing to some adjacent shore which is higher than this. In the straits of Gibraltar, the currents almost constantly drive to the eastward, and carry ships into the Mediterranean: they are also found to drive the same way into St George's channel.

The setting or progressive motion of the current may be either quite down to the bottom, or to a certain determinate depth. As the knowledge of the direction and velocity of currents is a very material article in navigation, it is highly necessary to discover both, in order to ascertain the ship's situation and course with as much accuracy as possible. The most successful method which has been hitherto practised by mariners for this purpose is as follows. A common iron pot, which may contain four or five gallons, is suspended by a small rope fastened to its ears or handles, so as to hang directly upright, as when placed upon the fire. This rope, which may be from 70 to 100 fathoms in length, being prepared for the experiment, is coiled in the boat, which is hoisted out of the ship at a proper opportunity, when there is little or no wind to ruffle the surface of the sea. The pot being then thrown overboard into the water, and immediately sinking, the line is slackened till about 70 or 80 fathoms of the line run out; after which the line is fastened to the boat's stern, by which she is accordingly restrained, and rides as at anchor. The velocity of the current is then easily tried by the *log* and half-minute glass, the usual method of discovering the rate of a ship's sailing at sea. The course of the stream is next obtained by the compass provided for this operation. Having thus found the setting and drift of the current, it next remains to apply this experiment to the purposes of navigation; for which see **NAVIGATION**, sect. vi.

CURRIERS, those who dress and colour leather after it comes from the tan-yard. See **TANNING**.

CURRYING, the method of preparing leather with oil, tallow, &c.

The chief business is to soften and supple cow and calve-skins, which make the upper-leathers and quarters of shoes, covering of saddles, coaches, and other things which must keep out water. 1. These skins, after coming from the tanner's yard*, having many fleshy fibres on them, the currier soaks them some time in common water. 2. He takes them out and stretches them on a very even wooden horse; then with a paring-knife, he scrapes off all the superfluous flesh, and puts them in to soak again. 3. He puts them wet on a hurdle, and tramples them with his heels, till they begin to grow soft and pliant. 4. He soaks thereon train-oil, which by its unctuous quality is the best liquor for this purpose. 5. He spreads them on large tables, and fastens them at the ends. There, with

Curriers
Currying.

* See *Tanning*.

Curling
||
Curtece.

with the help of an instrument called a *pummel*, which is a thick piece of wood, the under-side of which is full of furrows crossing each other, he folds, squares, and moves them forwards and backwards several times, under the teeth of this instrument, which breaks their too great stiffness. This is what is properly called *currying*. The order and number of these operations is varied by different curriers, but the material part is always the same. 6. After the skins are curried, there may be occasion to colour them. The colours are black, white, red, yellow, green, &c., the other colours are given by the skinners, who differ from curriers in this, that they apply their colours on the flesh-side; the curriers on the hair side. In order to whiten skins, they are rubbed with lumps of chalk, or white lead, and afterwards with pumice-stone. 7. When a skin is to be made black, after having oiled and dried it, he passes over it a puff dipt in water impregnated with iron; and after his first wetting, he gives it another in a water prepared with foot, vinegar, and gum-arabic. These different dyes gradually turn the skin black, and the operations are repeated till it be of a shining black. The grain and wrinkles which contribute to the suppleness of calves and cows leather, are made by the reiterated folds given to the skin in every direction, and by the care taken to scrape off all hard parts on the colour-side.

CURSING AND SWEARING; an offence against God and religion, and a sin of all others the most extravagant and unaccountable, as having no benefit or advantage attending it. By the last statute against this crime, 19 Geo. II. which repeals all former ones, every labourer, sailor, or soldier, profanely cursing or swearing, shall forfeit 1s.; every other person under the rank of a gentleman, 2s.; and every gentleman or person of superior rank, 5s. to the poor of the parish; and, on a second conviction, double; and, for every subsequent offence, treble the sum first forfeited, with all charges of conviction; and, in default of payment, shall be sent to the house of correction for 10 days. Any justice of the peace may convict upon his own hearing, or the testimony of one witness; and any constable, or peace-officer, upon his own hearing, may secure any offender and carry him before a justice, and there convict him. If the justice omits his duty, he forfeits 5l. and the constable 40s. And the act is to be read in all parish-churches and public chapels, the Sunday after every quarter-day, on pain of 5l. to be levied by warrant from any justice. Besides this punishment for taking God's name in vain in common discourse, it is enacted, by stat. 3 Jac. I. c. 21. that if in any stage-play, interlude, or show, the name of the holy Trinity, or any of the persons therein, be jestingly or profanely used, the offender shall forfeit 10l.; one moiety to the king, and the other to the informer.

CURSITOR, a clerk belonging to the court of chancery, whose business it is to make out original writs. In the statute 18 Edw. III. they are called *clerks of course*, and are 24 in number, making a corporation of themselves. To each of them is allowed a division of certain counties, into which they issue out the original writs required by the subject.

CURTATE DISTANCE, in astronomy, the distance of a planet from the sun to that point, where a per-

pendicular let fall from the planet meets with the ecliptic.

CURTATION, in astronomy, is the interval between a planet's distance from the sun, and the curteate distance.

CURTEYN, *curtana*, was the name of Edward the confessor's sword, which is the first sword carried before the kings of England at their coronation; and it is said the point of it is broken as an emblem of mercy.

CURTIN, *CURTAIN*, or *Courtin*, in fortification, is that part of the rampart of a place which is betwixt the flanks of two bastions, bordered with a parapet five feet high, behind which the soldiers stand to fire upon the covered way and into the moat.

CURTIUS (Quintus), a Roman gentleman *an. Rom.* 392. Understanding by the oracle, that a certain gulf in the forum, which boded misfortune to the city, could only be stopped by throwing the most precious thing they had into it; Curtius, considering of it, thought his own merit above all others, and leaped into the abyss, which (it is said) suddenly closed up.

CURTIUS (Quintus), a Latin historian who wrote the Life of Alexander the Great in 10 books, of which the two first are not indeed extant, but are so well supplied by Freinshemius, that the loss is scarcely regretted. Where this writer was born, or even when he lived, are points no one pretends to know: by his style he is supposed to have lived in or near the Augustan age; while some are not wanting, who imagine the work to have been composed in Italy about 300 years ago, and the name of *Quintus Curtius* to be fictitiously added to it. Cardinal du Perron was so great an admirer of this work, as to declare one page of it to be worth 30 of Tacitus; yet M. le Clerc, at the end of his Art of Criticism, has charged the writer with great ignorance, and many contradictions.

CURVATURE of a LINE, is the peculiar manner of its bending or flexure, by which it becomes a curve of such and such peculiar properties.

CURVE, in geometry, a line which running on continually in all directions, may be cut by one right line in more points than one. See CONIC SECTIONS, and FLUCTIONS.

CURVET, or **CORVET**, in the menage, an air in which the horse's legs are raised higher than in the demi volt; being a kind of leap up, and a little forwards, wherein the horse raises both his fore-legs at once, equally advanced, (when he is going straight forward, and not in a circle), and as his fore-legs are falling, he immediately raises his hind-legs, equally advanced, and not one before the other: so that all his four legs are in the air at once; and as he sets them down, he marks but twice with them.

CURVILINEAR, or **CURVILINEAL**, is said of figures bounded by curves, or crooked lines.

CURVIROSTRA, in ornithology. See LOXIA.

CURULE CHAIR, in Roman antiquity, a chair adorned with ivory, wherein the great magistrates of Rome had a right to sit and be carried.

The curule magistrates were the ædiles, the prætors, censors, and consuls. This chair was fitted in a kind of chariot, whence it had its name. The senators who had borne the offices of ædiles, prætors, &c. were carried to the senate-house in this chair, as were
also

Curtation
|
Curule.

Curzola
Cuscuta.

also those who triumphed, and such as went to administer justice, &c. See *ÆDILE*, &c.

CURZOLA, an island in the gulph of Venice, lying on the coast of Dalmatia: it is about 20 miles long, and has a small town of the same name, with a bishop's see. It belongs to the Venetians. E. Long. 17. 15. N. Lat. 43. 6.

CUSA (Nicholas de), a learned cardinal, born of mean parentage, and named from Cusa, the place of his birth. He was made a cardinal in 1448; and being appointed governor of Rome by pope Pius II. during his absence at Mantua, he was the chief concertor and manager of the war against the Turks. He founded a church, and a noble library of Greek and Latin authors, at Cusa; and left many excellent works behind him, which were collected and published in three volumes at Basil in 1565. In these he has made no scruple to detect the lying traditions and fophs of the Roman church.

CUSCO, a large and handsome town of South America, in Peru, formerly the residence of the Incas. It is seated at the foot of a mountain, and is built in a square form, in the middle of which there is the best market in all America: four large streets terminate in this square, which are all as straight as a line, and regard the four quarters of the world. The Spaniards tell us wonderful things of the richness of the Inca's palace, and of the temple of the sun; but more sober travellers, judging from what remains, think most of them to be fabulous. At present it contains eight large parishes, and five religious houses, the best of which belongs to the Jesuits; and the number of the inhabitants may be about 50,000, of which 3-4^{ths} are the original natives, Americans. From this town there is a very long road, which runs along the Cordeleim; and, at certain distances, there are small houses for resting-places, some parts of which are so artificially wrought, that it is surprizing how a people, who had no iron tools, could perform such workmanship. There are streams of water run through the town, which are a great convenience in so hot a country, where it never rains. It is 375 miles east of Lima. W. Long. 74. 37. S. Lat. 13. 0.

CUSCUTA, **DODDER**; a genus of the digynia order, belonging to the triandria class of plants. There are two species; one of which is a native of Britain, viz. the Europeæ, dodder, hell-weed, or devil's-guts. This is a very singular plant, almost destitute of leaves, parasitical, creeping, fixing itself to whatever is next to it. It decays at the root, and afterwards is nourished by the plant which supports it. Hops, flax, and nettles, are its common support; but principally the common nettle. Its blossoms are white. As soon as the shoots have twined about an adjacent plant, they send out from their inner surface a number of little vesicles or papillæ, which attach themselves to the bark or rind of the plant. By degrees the longitudinal vessels of the stalk, which appear to have accompanied the vesicles, shoot from their extremities, and make their way into the foster plant, by dividing the vessels and insinuating themselves into the tenderest part of the stalk; and so intimately are they united with it, that it is easier to break than to disengage them from it. The whole plant is bitter. It affords

a pale reddish colour. Cows, sheep, and swine, eat it; horses refuse it; goats are not fond of it.

CUSPIDATED, in botany, are such plants whose leaves are pointed like a spear.

CUSTOM, a very comprehensive term, denoting the manners, ceremonies, and fashions, of a people, which having turned into a habit, and passed into use, obtain the force of laws; in which sense it implies such usages, as, though voluntary at first, are yet by practice become necessary.

Custom is hence, both by lawyers and civilians, defined *lex non scripta*, "a law or right not written," established by long usage, and the consent of our ancestors: in which sense it stands opposed to the *lex scripta*, or "the written law." See *LAW*, Part II. n^o 38.—41.

CUSTOM and HABIT, in the human œconomy. The former is often confounded with the latter. By *custom* we mean a frequent reiteration of the same act; and by *habit*, the effect that custom has on the mind or body. This curious subject falls to be considered first in a moral, and secondly in a physical, light.

1. *Influence of Custom and Habit on the Mind, &c.* Custom hath such influence upon many of our feelings, by warping and varying them, that its operations demand the attention of all who would be acquainted with human nature. The subject, however, is intricate. Some pleasures are fortified by custom; and yet custom begets familiarity, and consequently indifference:

[If all the year were playing holidays,
To sport would be as tedious as to work:
But when they seldom come, they wish'd for come,
And nothing pleaseth, but rare accidents.]

Shakesp.

In many instances, satiety and disgust are the consequences of reiteration: again, though custom blunts the edge of distress and of pain; yet the want of any thing to which we have been long accustomed is a sort of torture. A clue to guide us through all the intricacies of this labyrinth, would be an acceptable present.

Whatever be the cause, it is certain that we are much influenced by custom: it hath an effect upon our pleasures, upon our actions, and even upon our thoughts and sentiments. Habit makes no figure during the vivacity of youth: in middle age it gains ground; and in old age governs without control. In that period of life, generally speaking, we eat at a certain hour, take exercise at a certain hour, go to rest at a certain hour, all by the direction of habit: nay, a particular seat, table, bed, comes to be essential; and a habit in any of these cannot be controlled without uneasiness.

Any slight or moderate pleasure, frequently reiterated for a long time, forms a peculiar connection between us and the thing that causes the pleasure. This connection, termed *habit*, has the effect to awaken our desire or appetite for that thing when it returns not as usual. During the course of enjoyment, the pleasure rises insensibly higher and higher till a habit be established; at which time the pleasure is at its height. It continues not, however, stationary: the same cu-

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stomary reiteration which carried it to its height, brings it down again by insensible degrees, even lower than it was at first; but of that circumstance afterward. What at present we have in view, is to prove by experiments, that those things which at first are but moderately agreeable, are the aptest to become habitual. Spirituous liquors, at first scarce agreeable, readily produce an habitual appetite: and custom prevails so far, as even to make us fond of things originally disagreeable, such as coffee, *assa-fetida*, and tobacco.

A walk upon the quarter-deck, though intolerably confined, becomes however so agreeable by custom, that a sailor in his walk on shore confines himself commonly within the same bounds. The author knew a man who had relinquished the sea for a country-life: in the corner of his garden he reared an artificial mount with a level summit, resembling most accurately a quarter-deck, not only in shape but in size; and here he generally walked. In Minorca governor Kane made an excellent road the whole length of the island; and yet the inhabitants adhere to the old road, though not only longer but extremely bad. Play or gaming, at first barely amusing by the occupation it affords, becomes in time extremely agreeable; and is frequently prosecuted with avidity, as if it were the chief business of life. The same observation is applicable to the pleasures of the internal senses, those of knowledge and virtue in particular: children have scarce any sense of these pleasures; and men very little who are in the state of nature without culture: our taste for virtue and knowledge improves slowly; but is capable of growing stronger than any other appetite in human nature.

To introduce an active habit, frequency of acts is not sufficient without length of time: the quickest succession of acts in a short-time, is not sufficient; nor a slow succession in the longest time. The effect must be produced by a moderate swift action, and a long series of easy touches, removed from each other by short intervals. Nor are these sufficient without regularity in the time, place, and other circumstances of the action: the more uniform any operation is, the sooner it becomes habitual. And this holds equally in a passive habit; variety in any remarkable degree, prevents the effect: thus any particular food will scarce ever become habitual, where the manner of dressing is varied. The circumstances then requisite to augment a moderate pleasure, and at the long-run to form a habit, are weak uniform acts, reiterated du-

ring a long course of time, without any considerable interruption: every agreeable cause that operates in this manner, will grow habitual.

Affection and aversion, as distinguished from passion on the one hand, and on the other from original disposition, are in reality habits respecting particular objects, acquired in the manner above set forth. The pleasure of social intercourse with any person, must originally be faint, and frequently reiterated, in order to establish the habit of affection. Affection thus generated, whether it be friendship or love, seldom swells into any tumultuous or vigorous passion; but is however the strongest cement that can bind together two individuals of the human species. In like manner, a slight degree of disgust often reiterated with regularity, grows into the habit of aversion, which commonly subsists for life.

Objects of taste that are delicious, far from tending to become habitual, are apt by indulgence to produce satiety and disgust: no man contracts a habit of sugar, honey, or sweet-meats, as he doth of tobacco.

These violent delights have violent ends,
In their triumph die. The sweetest honey
Is loathsome in its own deliciousness,
And in the taste confounds the appetite;
Therefore love moderately, long love doth so;
Too swift arrives as tardy as too slow.

Romeo and Juliet, act 2. sc. 6.

The same observation holds with respect to all objects that being extremely agreeable raise violent passions: such passions are incompatible with a habit of any sort; and in particular they never produce affection nor aversion: a man who at first sight falls violently in love, has a strong desire of enjoyment, but no affection for the woman (A): a man who is surprised with an unexpected favour, burns for an opportunity to exert his gratitude, without having any affection for his benefactor: neither does desire of vengeance for an atrocious injury, involve aversion.

It is perhaps not easy to say why moderate pleasures gather strength by custom: but two causes concur to prevent that effect in the more intense pleasures. These, by an original law in our nature, increase quickly to their full growth, and decay with no less precipitation*; and custom is too slow in its operation to overcome that law. The other cause is not less powerful: exquisite pleasure is extremely fatiguing; occasioning, as a naturalist would say, great expense of animal spirits; and of such the mind cannot

* See EMOTION and
Passions,
n^o ix.

(A) Violent love without affection is finely exemplified in the following story. When Constantine was taken by the Turks, Irene, a young Greek of an illustrious family, fell into the hands of Mahomet II. who was at that time in the prime of youth and glory. His savage heart being subdued by her charms, he shut himself up with her, denying access even to his ministers. Love obtained such ascendancy as to make him frequently abandon the army, and fly to his Irene. War relaxed, for victory was no longer the monarch's favourite passion. The soldiers, accustomed to booty, began to murmur, and the infection spread even among the commanders. The Basha Mustafa, consulting the fidelity he owed his master, was the first who durst acquaint him of the discourses held publicly to the prejudice of his glory.

The Sultan, after a gloomy silence, formed his resolution. He ordered Mustafa to assemble the troops next morning; and then with precipitation retired to Irene's apartment. Never before did that prince appear so charming; never before did the prince bestow so many warm caresses. To give a new lustre to her beauty, he exhorted her women next morning to bestow their utmost art and care on her dress. He took her by the hand, led her into the middle of the army, and pulling off her veil, demanded of the basbas with a fierce look, whether they had ever beheld such a beauty? After an awful pause, Mahomet with one hand laying hold of the young Greek by her beautiful locks, and with the other pulling out his scimitar, severed the head from the body at one stroke. Then turning to his grandees, with eyes wild and furious, "This sword," says he, "when it is my will, knows as to cut the bands of love." However strange it may appear, we learn from experience, that desire of enjoyment may confound with the most brutal aversion, directed both to the same woman. Of this we have a noted example in the first book of Sully's *Memoirs*; to which we chuse to refer the reader, for it is too gross to be transcribed.

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not bear so frequent gratification, as to superinduce a habit: if the thing that raises the pleasure return before the mind have recovered its tone and relish, disgust ensues instead of pleasure.

A habit never fails to admonish us of the wonted time of gratification, by raising a pain for want of the object, and a desire to have it. The pain of want is always first felt: the desire naturally follows; and upon presenting the object, both vanish instantaneously. Thus a man accustomed to tobacco, feels, at the end of the usual interval, a confused pain of want, which at first points at nothing in particular, though it soon settles upon its accustomed object: and the same may be observed in persons addicted to drinking, who are often in an uneasy restless state before they think of the bottle. In pleasures indulged regularly, and at equal intervals, the appetite, remarkably obsequious to custom, returns regularly with the usual time of gratification; not sooner, even though the object be presented. This pain of want arising from habit, seems directly opposite to that of satiety; and it must appear singular, that frequency of gratification should produce effects so opposite, as are the pains of excess and of want.

The appetites that respect the preservation and propagation of our species, are attended with a pain of want similar to that occasioned by habit: hunger and thirst are uneasy sensations of want, which always precede the desire of eating or drinking; and a pain for want of carnal enjoyment, precedes the desire of an object. The pain being thus felt independent of an object, cannot be cured but by gratification. Very different is an ordinary passion, in which desire precedes the pain of want: such a passion cannot exist but while the object is in view; and therefore, by removing the object out of thought, it vanisheth with its desire and pain of want*.

The natural appetites above mentioned, differ from habit in the following particular: they have an undetermined direction toward all objects of gratification in general; whereas an habitual appetite is directed to a particular object: the attachment we have by habit to a particular woman, differs widely from the natural passion which comprehends the whole sex; and the habitual relish for a particular dish, is far from being the same with a vague appetite for food. That difference notwithstanding, it is still remarkable, that nature hath enforced the gratification of certain natural appetites essential to the species, by a pain of the same sort with that which habit produceth.

The pain of habit is less under our power than any other pain that arises from want of gratification: hunger and thirst are more easily endured, especially at first, than an unusual intermission of any habitual pleasure: persons are often heard declaring, they would forego sleep or food, rather than tobacco. We must not however conclude, that the gratification of an habitual appetite affords the same delight with the gratification of one that is natural: far from it; the pain of want only, is greater.

The slow and reiterated acts that produce a habit, strengthen the mind to enjoy the habitual pleasure in greater quantity and more frequently than originally; and by that means a habit of intemperate gratification

is often formed: are without unbounded acts of intemperance, the habitual relish is soon restored, and the pain for want of enjoyment returns with fresh vigour.

The causes of the present emotions hitherto in view, are either an individual, such as a companion, a certain dwelling-place, a certain amusement; or a particular species, such as coffee, mutton, or any other food. But habit is not confined to such. A constant train of trifling diversions, may form such a habit in the mind, that it cannot be ealy a moment without amusement: a variety in the objects prevents a habit as to any one in particular; but as the train is uniform with respect to amusement, the habit is formed accordingly; and that sort of habit may be denominated a *generic habit*, in opposition to the former, which is a *specific habit*. A habit of a town-life, of country-sports, of solitude, of reading, or of business, where sufficiently varied, are instances of generic habits. Every specific habit hath a mixture of the generic; for the habit of any one sort of food makes the taste agreeable, and we are fond of that taste wherever found. Thus a man deprived of an habitual object, takes up with what most resembles it; deprived of tobacco, any bitter herb will do, rather than want: a habit of punch, makes wine a good resource: accustomed to the sweet society and comforts of matrimony, the man unhappily deprived of his beloved object, inclines the sooner to a second. In general, when we are deprived of a habitual object, we are fond of its qualities in any other object.

The reasons are assigned above, why the causes of intense pleasure become not readily habitual: but now we discover, that these reasons conclude only against specific habits. In the case of a weak pleasure, a habit is formed by frequency and uniformity of reiteration, which, in the case of an intense pleasure, produceth satiety and disgust. But it is remarkable, that satiety and disgust have no effect, except as to that thing singly which occasions them: a surfeit of honey produceth not a loathing of sugar; and intemperance with one woman produceth no disselish of the same pleasure with others. Hence it is easy to account for a generic habit in any intense pleasure: the delight we had in the gratification of the appetite, enflames the imagination, and makes us, with avidity, search for the same gratification in whatever other object it can be found. And thus uniform frequency in gratifying the same passion upon different objects, produceth at length a generic habit. In this manner, one acquires an habitual delight in high and poignant sauces, rich dress, fine equipages, crowds of company, and in whatever is commonly termed *pleasure*. There concurs at the same time, to introduce this habit, a peculiarity observed above, that reiteration of acts enlarges the capacity of the mind, to admit a more plentiful gratification than originally, with regard to frequency as well as quantity.

Hence it appears, that though a specific habit cannot be formed but upon a moderate pleasure, a generic habit may be formed upon any sort of pleasure, moderate or immoderate, that hath variety of objects. The only difference is, that a weak pleasure runs naturally into a specific habit; whereas an intense pleasure is altogether averse to such a habit. In a word,

* Reference
ut supra.

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it is only in singular cases that a moderate pleasure produces a generic habit; but an intense pleasure cannot produce any other habit.

The appetites that respect the preservation and propagation of the species, are formed into habit in a peculiar manner; the time as well as measure of their gratification are much, under the power of custom; which, introducing a change upon the body, occasions a proportional change in the appetites. Thus, if the body be gradually formed to a certain quantity of food at stated times, the appetite is regulated accordingly; and the appetite is again changed, when a different habit of body is introduced by a different practice. Here it would seem, that the change is not made upon the mind, which is commonly the case in passive habits, but upon the body.

When rich food is brought down by ingredients of a plainer taste, the composition is susceptible of a specific habit. Thus the sweet taste of sugar, rendered less poignant in a mixture, may, in course of time, produce a specific habit for such mixture. As moderate pleasures, by becoming more intense, tend to generic habits; so intense pleasures, by becoming more moderate, tend to specific habits.

The beauty of the human figure, by a special recommendation of nature, appears to us supreme, amid the great variety of beautiful forms bestowed upon animals. The various degrees in which individuals enjoy that property, render it an object, sometimes of a moderate, sometimes of an intense passion. The moderate passion, admitting frequent reiteration without diminution, and occupying the mind without exhausting it, turns gradually stronger till it becomes a habit. Nay, instances are not wanting, of a face at first disagreeable, afterward rendered indifferent by familiarity, and at length agreeable by custom. On the other hand, consummate beauty, at the very first glance, fills the mind so as to admit no increase. Enjoyment lessens the pleasure*; and if often repeated, ends commonly in satiety and disgust. The impressions made by consummate beauty, in a gradual succession from lively to faint, constitute a series opposite to that of faint impressions waxing gradually more lively, till they produce a specific habit. But the mind, when accustomed to beauty, contracts a relish for it in general, though often repelled from particular objects by the pain of satiety; and thus a generic habit is formed, of which inconstancy in love is the necessary consequence; for a generic habit, comprehending every beautiful object, is an invincible obstruction to a specific habit, which is confined to one.

But a matter which is of great importance to the youth of both sexes, deserves more than a cursory view. Though the pleasant emotion of beauty differs widely from the corporeal appetite, yet when both are directed to the same object, they produce a very strong complex passion*: enjoyment in that case must be exquisite; and therefore more apt to produce satiety than in any other case whatever. This is a never-failing effect, where consummate beauty in the one party, meets with a warm imagination and great sensibility in the other. What we are here explaining, is true without exaggeration; and they must be insensible upon whom it makes no impression: it de-

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erves well to be pondered by the young and the amorous, who, in forming the matrimonial society, are too often blindly impelled by the animal pleasure merely, enflamed by beauty. It may indeed happen after the pleasure is gone, and go it must with a swift pace, that a new connection is formed upon more dignified and more lasting principles: but this is a dangerous experiment; for even supposing good sense, good temper, and internal merit of every sort, yet a new connection upon such qualifications is rarely formed: it commonly, or rather always happens, that such qualifications, the only solid foundation of an indissoluble connection, are rendered altogether invisible by satiety of enjoyment creating disgust.

One effect of custom, different from any that have been explained, must not be omitted, because it makes a great figure in human nature: though custom augments moderate pleasures, and lessens those that are intense, it has a different effect with respect to pain; for it blunts the edge of every sort of pain and distress, faint or acute. Uninterrupted misery, therefore, is attended with one good effect: if its torments be incessant, custom hardens us to bear them.

The changes made in forming habits, are curious. Moderate pleasures are augmented gradually by reiteration, till they become habitual; and then are at their height: but they are not long stationary; for from that point they gradually decay, till they vanish altogether. The pain occasioned by want of gratification, runs a different course: it increases uniformly; and at last becomes extreme, when the pleasure of gratification is reduced to nothing.

———It so falls out,

That what we have we prize not to the worth,
While we enjoy it; but being lack'd and lost,
Why then we rack the value; and then find
The virtue that possession would not show us
Whilst it was ours.

Much ado about nothing, act 4. sc. 2.

The effect of custom with relation to a specific habit, is displayed through all its varieties in the use of tobacco. The taste of that plant is at first extremely unpleasant: our disgust lessens gradually, till it vanishes altogether; at which period the taste is neither agreeable nor disagreeable: continuing the use of the plant, we begin to relish it; and our relish improves by use, till it arrive at perfection: from that period it gradually decays, while the habit is in a state of increment, and consequently the pain of want. The result is, that when the habit has acquired its greatest vigour, the relish is gone; and accordingly we often smoke and take snuff habitually, without so much as being conscious of the operation. We must except gratification after the pain of want; the pleasure of which gratification is the greatest when the habit is the most vigorous: it is of the same kind with the pleasure one feels upon being delivered from the rack, the cause of which is explained elsewhere*. This pleasure however is but occasionally the effect of habit; and however exquisite, is avoided as much as possible because of the pain that precedes it.

With regard to the pain of want, we can discover no difference between a generic and a specific habit; but

* Reference
ut supra.

* See EMO-
TIONS and
Passions,
n^o 36.

* See EMO-
TIONS and
Passions,
n^o iii.

Story and but these habits differ widely with respect to the positive pleasure. We have had occasion to observe, that the pleasure of a specific habit decays gradually till it turn imperceptible: the pleasure of a generic habit on the contrary, being supported by variety of gratification, suffers little or no decay after it comes to its height. However it may be with other generic habits, the observation certainly holds with respect to the pleasures of virtue and of knowledge: the pleasure of doing good has an unbounded scope, and may be so variously gratified that it can never decay; science is equally unbounded; our appetite for knowledge having an ample range of gratification; where discoveries are recommended by novelty, by variety, by utility, or by all of them.

In this intricate enquiry, we have endeavoured, but without success, to discover by what particular means it is that custom hath influence upon us; and now nothing seems left, but to hold our nature to be so framed as to be susceptible of such influence. And supposing it purposely so framed, it will not be difficult to find out several important final causes. That the power of custom is a happy contrivance for our good, cannot have escaped any one who reflects, that business is our province, and pleasure our relaxation only. Now satiety is necessary to check exquisite pleasures, which otherwise would engross the mind and unqualify us for business. On the other hand, as business is sometimes painful, and is never pleasant beyond moderation, the habitual increase of moderate pleasure, and the conversion of pain into pleasure, are admirably contrived for disappointing the malice of Fortune, and for reconciling us to whatever course of life may be our lot:

How else doth breed a habit in a man!
This shadowy desert, unfrequented woods,
I better brook than flourishing peopled towns.
Here I can sit alone, unseen of any,
And to the nightingale's complaining notes
Tune my distresses, and record my woes.

Two Gentlemen of Verona, act 5. sc. 4.

As the foregoing distinction between intense and moderate, hold in pleasure only, every degree of pain being softened by time, custom is a catholicon for pain and distress of every sort; and of that regulation the final cause requires no illustration.

Another final cause of custom will be highly relished by every person of humanity, and yet has in a great measure been overlooked; which is, that custom hath a greater influence than any other known cause, to put the rich and the poor upon a level: weak pleasures, the share of the latter, become fortunately stronger by custom; while voluptuous pleasures, the share of the former, are continually losing ground by satiety. Men of fortune, who possess palaces, sumptuous gardens, rich fields, enjoy them less than passengers do. The goods of Fortune are not unequally distributed: the opulent profits what others enjoy.

And indeed, if it be the effect of habit, to produce the pain of want in a high degree while there is little pleasure in enjoyment, a voluptuous life is of all the least to be envied. Those who are habituated to high feeding, easy vehicles, rich furniture, a crowd of va-

lets, much deference and flattery, enjoy but a small share of happiness, while they are exposed to manifold distresses. To such a man, enslaved by ease and luxury, even the petty inconveniences in travelling, of a rough road, bad weather, or homely fare, are serious evils: he loses his tone of mind, turns peevish, and would wreak his resentment even upon the common accidents of life. Better far to use the goods of Fortune with moderation: a man who by temperance and activity hath acquired a hardy constitution, is, on the one hand, guarded against external accidents; and, on the other, is provided with great variety of enjoyment ever at command.

We shall close this branch of the subject with an article more delicate than abstruse, *viz.* what authority custom ought to have over our taste in the fine arts. One particular is certain, that we cheerfully abandon to the authority of custom things that nature hath left indifferent. It is custom, not nature, that hath established a difference between the right hand and the left, so as to make it awkward and disagreeable to use the left where the right is commonly used. The various colours, though they affect us differently, are all of them agreeable in their purity: but custom has regulated that matter in another manner; a black skin upon a human being, is to us disagreeable; and a white skin probably not less so to a negro. Thus things, originally indifferent, become agreeable or disagreeable by the force of custom. Nor will this be surprising after the discovery made above, that the original agreeableness or disagreeableness of an object, is, by the influence of custom, often converted into the opposite quality.

Proceeding to matters of taste, where there is naturally a preference of one thing before another; it is certain, in the first place, that our faint and more delicate feelings are readily susceptible of a bias from custom; and therefore that it is no proof of a defective taste, to find these in some measure influenced by custom: dress and the modes of external behaviour, are regulated by custom in every country: the deep red or vermilion with which the ladies in France cover their cheeks, appears to them beautiful in spite of nature; and strangers cannot altogether be justified in condemning that practice, considering the lawful authority of custom, or of the *fashion* as it is called: it is told of the people who inhabit the skirts of the Alps facing the north, that the swelling they universally have in the neck is to them agreeable. So far has custom power to change the nature of things, and to make an object originally disagreeable, take on an opposite appearance.

But as to every particular that can be denominated proper or improper, right or wrong, custom has little authority, and ought to have none. The principle of duty takes naturally place of every other; and it argues a shameful weakness or degeneracy of mind, to find it in any case so far subdued as to submit to custom.

II. Effects of Custom and Habit in the animal Economy. These may be reduced to five heads. 1. On the simple solids. 2. On the organs of sense. 3. On the moving power. 4. On the whole nervous power. 5. On the system of blood-vessels.

I. Effects

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Galen's lec-
tures on the
Mud. Med.

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1. *Effects on the simple solids.* Custom determines the degree of flexibility of which they are capable. By frequently repeated flexion, the several particles of which these solids consist are rendered more supple and moveable on each other. A piece of catgut, *e. g.* when on the stretch, and having a weight appended to its middle, will be bended thereby perhaps half an inch; afterwards, by frequent repetitions of the same weight, or by increasing the weight, the flexibility will be rendered double. The degree of flexibility has a great effect in determining the degree of oscillation, provided that elasticity is not affected; if it go beyond this, it produces flaccidity. Again, custom determines the degree of tension; for the same elastic chord that now oscillates in a certain degree of tension, will, by frequent repetition of these oscillations, be so far relaxed, that the extension must be renewed in order to produce the same tension, and consequently the same vibrations, as at first. This appears in many instances in the animal economy, as when different muscles concur to give a fixed point, or tension to each other: and thus a weakly child totters as it walks; but by giving it a weight to carry, and by thus increasing the tension of the system, it walks more steadily. In like manner the fulness of the system gives strength, by distending the vessels every where, and so giving tension: hence a man, by good nourishment, from being weak, acquires a great increase of strength in a few days; and, on the other hand, evacuations weakened by taking off the tension.

2. *Effects on the Organs of Sense.* Repetition gives a greater degree of sensibility, in so far only as it renders perception more accurate. Repetition alone gives lasting impressions, and thus lays the foundation of memory; for single impressions are but retained for a short time, and are soon forgot. Thus a person, who at present has little knowledge of cloths, will, by frequently handling them, acquire a skill of discerning them, which to others seems almost impossible. Many are apt to mistake this for a nicer sensibility, but they are more mistaken; for it is an universal law, that the repetition of impression renders us less acute. This is well illustrated by the operation of medicines; for all medicines which act on the organs of sense must, after some time, be increased in their dose, to produce the same effects as at first. This affords a rule in practice with regard to these medicines; it becoming necessary, after a certain time, to change one medicine even for a weaker of the same nature. Thus medicines, which even have no great apparent force, are found, by long use, to destroy the sensibility of the system to other impressions. But to this general rule, that, by repetition, the force of impressions is more and more diminished, there are some exceptions. Thus persons, by a strong emetic, have had their stomachs rendered so irritable, that 1-20th of the first dose was sufficient to produce the same effect. This, however, often takes place when the vomit is repeated every day; for if the same vomit be given at pretty considerable intervals, the general rule is observed to hold good. Thus two contrary effects of habit are to be noted; and it is proper to observe, that the greater irritability is more readily produced when the first impression is great, as in the case first given of

the strong emetic. This may be farther illustrated by the effect of fear, which is commonly observed to be diminished on repetition; which can only be attributed to custom: while, on the other hand, there are instances of persons, who, having once got a great fright, have for ever after continued slaves to fears excited by impressions of the like kind, however slight; which must be imputed entirely to excess of the first impression, as has been already observed. To this head also belongs the association of ideas, which is the foundation of memory and all our intellectual faculties, and is entirely the effect of custom; with regard to the body also, these associations often take place. And sometimes, in producing effects on the body, associations seemingly opposite are formed, which, through custom, become absolutely necessary; *e. g.* a person long accustomed to sleep in the neighbourhood of a great noise, is so far from being incommode on that account, that afterwards such noise becomes necessary to produce sleep. It will be of use to attend to this in medical practice; for we ought to allow for, however opposite it may seem at the time, whatever usually attended the purpose we designed to effect. Thus, in the instance of sleep, we must not exclude noise when we want to procure rest, or any causes which may seem opposite to such an effect, provided custom has rendered them necessary.

3. *Effects on the Moving Fibres.* A certain degree of tension is necessary to motion, which is to be determined by custom; *e. g.* a fencer, accustomed to one foil, cannot have the same steadiness or activity with one heavier or lighter. It is necessary also that every motion should be performed in the same situation, or posture of the body, as the person has been accustomed to employ in that motion. Thus, in any surgical operation, a certain posture is recommended; but if the operator has been accustomed to another, such a one, however awkward, becomes necessary afterwards to his right performance of that operation.

Custom also determines the degree of oscillation, of which the moving fibres are capable. A person accustomed to strong muscular exertions is quite incapable of the more delicate. Thus writing is performed by small muscular contractions; but if a person has been accustomed to stronger motions with these muscles, he will write with much less steadiness.

This subject of tension, formerly attributed to the *simple fibres*, is probably more strictly applicable to the moving: for, besides a tension from flexion, there is also a tension from irritation and sympathy; *e. g.* the tension of the stomach from food, gives tension to the whole body. Wine and spiritous liquors give tension; *e. g.* a person that is so affected with tremor as scarcely to hold a glass of any of these liquors to his head, has no sooner swallowed it, than his whole body becomes steady; and after the system has been accustomed to such stimuli, if they are not applied at the usual time, the whole body becomes flaccid, and, of consequence, unsteady in its motions.

Again, custom gives facility of motion. This seems to proceed from the distension which the nervous power gives to the moving fibres themselves. But in whatever manner it is occasioned, the effect is obvious,

Custom and habit, and; for any new or unusual motion is performed with great difficulty.

It is supposed that sensation depends on a communication with the sensorium commune, by means of organs sufficiently distended with nervous influence. We have found, that sensibility is diminished by repetition. And we have now to observe, that in some cases it may be increased by repetition, owing to the nervous power itself flowing more easily into the part on account of custom. Attention to a particular object may also determine a greater influx into any particular part, and thus the sensibility and irritability of that particular part may be increased.

But with regard to facility of motion, the nervous power, no doubt, flows most easily into those parts to which it has been accustomed: yet facility of motion does not entirely depend on this, but in part also on the concurrence of the action of a great many muscles; e. g. Winslow has observed, that, in performing any motion, a number of muscles concur to give a fixed point to those intended chiefly to act, as well as to others that are to vary and modify their action. This, however, is assisted by repetition, and the freer influx; as by experience we know the proper attitude for giving a fixed point in order to perform any action with facility and steadiness.

Custom gives a spontaneous motion also, which seems to recur at stated periods, even when the exciting causes are removed. Thus, if the stomach has been accustomed to vomit from a particular medicine, it will require a much smaller dose than at first, nay, even the very sight or remembrance of it will be sufficient to produce the effect; and there are not wanting instances of habitual vomiting, from the injudicious administration of emetics. It is on this account that all spasmodic affections so easily become habitual, and are so difficult of cure; as we must not only avoid all the exciting causes, even in the smallest degree, but also their associations.

Custom also gives strength of motion: strength depends on strong oscillations, a free and copious influx of the nervous power, and on dense solids. But in what manner all these circumstances have been brought about by repetition, has been already explained. The effect of custom, in producing strength, may be thus illustrated: a man that begins with lifting a calf, by continuing the same practice every day, will be able to lift it when grown to the full size of a bull.

All this is of considerable importance in the practice of physic, though but too little regarded; for the recovery of weak people, in great measure, depends on the use of exercise, suited to their strength, or rather within it, frequently repeated and gradually increased. Farther, it is necessary to observe, that custom regulates the particular celerity with which each motion is to be performed: for a person accustomed, for a considerable time, to one degree of celerity, becomes incapable of a greater; e. g. a man accustomed to slow walking will be out of breath before he can run 20 paces. The train, or order, in which our motions are to be performed, is also established by custom; for if a man hath repeated motions, for a certain time, in any particular order, he cannot afterwards perform them in any other. Custom also very frequently associates

motions and sensations: thus, if a person has been in the use of associating certain ideas with the ordinary stimulus which in health excites urine, without these ideas the usual inclination will scarce excite that excretion; and, when these occur, will require it even in the absence of the primary exciting cause: e. g. it is very ordinary for a person to make urine when going to bed; and if he has been, for any length of time, accustomed to do so, he will ever afterwards make urine at that time, though otherwise he would often have no such inclination: by this means some secretions become, in a manner, subject to the will. The same may be said of going to stool: and this affords us a good rule in the case of costiveness; for by endeavouring to fix a stated time for this evacuation, it will afterwards, at such time, more readily return. It is farther remarkable, that motions are inseparably associated with other motions: this, perhaps, very often proceeds from the necessary degree of tension; but it also often depends merely on custom, an instance of which we have in the uniform motions of our eyes.

4. *Effects on the whole Nervous Power.* We have found, that, by custom, the nervous influence may be determined more easily into one part than another, and therefore, as all the parts of the system are strongly connected, the sensibility, irritability, and strength of any particular part, may be thus increased. Custom also has the power of altering the natural temperament, and of inducing a new one. It is also in the power of custom to render motions periodical, and periodically spontaneous. An instance of this we have in sleep, which is commonly said to be owing to the nervous power being exhausted, the necessary consequence of which is sleep, e. g. a rest of the voluntary motions to favour the recruit of that power: but if this were the case, the return of sleep should be at different times, according as the causes which diminish the nervous influence operate more or less powerfully; whereas the case is quite otherwise, these returns of sleep being quite regular. This is no less remarkable in the appetites, that return at particular periods, independent of every cause but custom. Hunger, e. g. is an extremely uneasy sensation; but goes off of itself, if the person did not take food at the usual time. The excretions are farther proofs of this, e. g. going to stool, which, if it depended on any particular irritation, should be at longer or shorter intervals according to the nature of the aliment. There are many other instances of this disposition of the nervous influence to periodical motions, as the story of the idiot of Stafford, recorded by Dr Plot, (Spectator, n^o 447.) who, being accustomed to tell the hours of the church-clock, as it struck, told them as exactly when it did not strike by its being out of order. Montaigne tells us of some oxen that were employed in a machine for drawing water, who, after making 300 turns, which was the usual number, could be stimulated by no whip or goad to proceed farther. Infants, also, cry for and expect the breast at those times in which the nurse has been accustomed to give it.

Hence it would appear, that the human œconomy is subject to periodical revolutions, and that these happen not oftener may be imputed to variety; and this seems to be the reason why they happen oftener in the body.

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body than mind, because that is subject to greater variety. We see frequent instances of this in diseases, and in their crises; intermitting fevers, epilepsies, asthma, &c. are examples of periodical affections: and that critical days are not so strongly marked in this country as in Greece, and some others, may be imputed to the variety and instability of our climate; but perhaps still more to the less sensibility and irritability of our system; for the exhibition of medicine has little effect in disturbing the crises, though it be commonly assigned as a cause.

We are likewise subject to many habits independent of ourselves, as from the revolutions of the celestial bodies, particularly the sun, which determines the body, perhaps, to other daily revolutions besides sleeping and waking. There are also certain habits depending on the seasons. Our connections, likewise, with respect to mankind, are means of inducing habits. Thus regularity from associating in business, induces regular habits both of mind and body.

There are many diseases, which, though they arose at first from particular causes, at last continue merely through custom or habit. These are chiefly of the nervous system. We should, therefore, study to counteract such habits; and accordingly Hippocrates, among other things for the cure of epilepsy, orders an entire change of the manner of life. We likewise imitate this in the chin cough; which often resists all remedies till the air, diet, and ordinary train of life, are changed.

5. *Effects on the Blood-vessels.* From what has been said on the nervous power, the distribution of the fluids must necessarily be variously affected by custom, and with that the distribution of the different excretions; for though we make an estimate of the proportion of the excretion to one another, according to the climate and seasons, they must certainly be very much varied by custom.

On this head we may observe, that blood-letting has a manifest tendency to increase the quantity of the blood; and if this evacuation be repeated at stated times, such symptoms of repletion, and such motions are excited at these times, as render the operation necessary. The same has been observed in some spontaneous hæmorrhages. These, indeed, at first, may have some exciting causes, but afterwards they seem to depend chiefly on custom. The best proof of this is with regard to the menstrual evacuation. There is certainly something originally in females, that determines that evacuation to the monthly periods. Constant repetition of this, comes to fix it, independent of strong causes, either favouring or preventing repletion; e. g. blood-letting will not impede it, nor filling the body induce it: and, indeed, so much is this evacuation connected with periodical motions, that it is little in our power to produce any effect by medicines but at those particular times. Thus if we would relax the uterine system, and bring back this evacuation when suppressed, our attempts would be vain and fruitless, unless given at that time when the menses should have naturally returned.

CUSTOMS, in political economy, or the duties, toll, tribute, or tariff, payable to the king upon merchandize exported and imported, form a branch of the

perpetual taxes. See TAX. The considerations upon which this revenue (or the more ancient part of it, which arose only from exports), was invested in the king, were said to be two: 1. Because he gave the subject leave to depart the kingdom, and to carry his goods along with him. 2. Because the king was bound of common right to maintain and keep up the ports and havens, and to protect the merchant from pirates. Some have imagined they are called with us *customs*, because they were the inheritance of the king by immemorial usage and the common law, and not granted him by any statute: but Sir Edward Coke hath clearly shewn, that the king's first claim to them was by grant of parliament 3 Edw. I. though the record thereof is not now extant. And indeed this is in express words confessed by statute 25 Edw. I. c. 7. wherein the king promises to take no customs from merchants, without the common assent of the realm, "saying to us and our heirs, the customs on wool, skins, and leather, formerly granted to us by the commonalty aforesaid." These were formerly called *hereditary customs* of the crown; and were due on the exportation only of the said three commodities, and of none other: which were styled the *staple* commodities of the kingdom, because they were obliged to be brought to those ports where the king's staple was established, in order to be there first rated, and then exported. They were denominated in the barbarous Latin of our ancient records, *custumæ*, (an appellation which seems to be derived from the French word *costum*, or *coûtum*, which signifies toll or tribute, and owes its own etymology to the word *costi*, which signifies price, charge, or, as we have adopted it in English, *cost*); not *consuetudines*, which is the language of our law whenever it means merely usages. The duties on wool, sheep-skins or woollens, and leather, exported, were called *custumæ antiquæ sive magnæ*: and were payable by every merchant, as well native as stranger; with this difference, that merchant-strangers paid an additional toll, viz. half as much again as was paid by natives. The *custumæ parvæ et novæ* were an impost of 3d. in the pound, due from merchant-strangers only, for all commodities as well imported as exported; which was usually called the *alien's* duty, and was first granted in 31 Edw. I. But these ancient hereditary customs, especially those on wool and woollens, came to be of little account, when the nation became sensible of the advantages of a home manufacture, and prohibited the exportation of wool by statute 11 Edw. III. c. 1.

Other customs payable upon exports and imports were distinguished into subsidies, tonnage, poundage, and other imposts. Subsidies were such as were imposed by parliament upon any of the staple commodities before mentioned, over and above the *custumæ antiquæ et magnæ*: tonnage was a duty upon all wines imported, over and above the prisage and butlerage aforesaid: poundage was a duty imposed *ad valorem*, at the rate of 12 d. in the pound, on all other merchandize whatsoever: and the other imposts were such as were occasionally laid on by parliament, as circumstances and times required. These distinctions are now in a manner forgotten, except by the officers immediately concerned in this department; their produce

Customs.

Customs. duce being in effect all blended together, under the one denomination of the *customs*.

By these we understand, at present, a duty or subsidy paid by the merchant, at the quay, upon all imported as well as exported commodities, by authority of parliament; unless where, for particular national reasons, certain rewards, bounties, or drawbacks, are allowed for particular exports or imports. The customs thus imposed by parliament, are chiefly contained in two books of rates, set forth by parliamentary authority; one signed by Sir Harbottle Grimston, speaker of the house of commons in Charles the second's time; and the other an additional one signed by Sir Spenser Compton, speaker in the reign of George the first; to which also subsequent additions have been made. Aliens pay a larger proportion than natural subjects, which is what is now generally understood by the aliens duty; to be exempted from which is one principal cause of the frequent applications to parliament for acts of naturalization.

These customs are then, we see, a tax immediately paid by the merchant, although ultimately by the consumer. And yet these are the duties felt least by the people; and, if prudently managed, the people hardly consider that they pay them at all. For the merchant is easy, being sensible he does not pay them for himself; and the consumer, who really pays them, confounds them with the price of the commodity: in the same manner as Tacitus observes, that the emperor Nero gained the reputation of abolishing the tax of the sale of slaves, though he only transferred it from the buyer to the seller; so that it was, as he expresses it, "*remissum magis specie, quam vi: quia, cum venditor pendere juberetur, in partem pretii emptoribus accrescebat.*" But this inconvenience attends it on the other hand, that these imposts, if too heavy, are a check and cramp upon trade; and especially when the value of the commodity bears little or no proportion to the quantity of the duty imposed. This in consequence gives rise also to smuggling, which then becomes a very lucrative employment: and its natural and most reasonable punishment, *viz.* confiscation of the commodity, is in such cases quite ineffectual; the intrinsic value of the goods, which is all that the smuggler has paid, and therefore all that he can lose, being very inconsiderable when compared with his prospect of advantage in evading the duty. Recourse must therefore be had to extraordinary punishments to prevent it; perhaps even to capital ones: which destroys all proportion of punishment, and puts murderers upon an equal footing with such as are really guilty of no natural, but merely a positive offence.

There is also another ill consequence attending high imposts on merchandise, not frequently considered, but indubitably certain; that the earlier any tax is laid on a commodity, the heavier it falls upon the consumer in the end: for every trader, through whose hands it passes, must have a profit, not only upon the raw material and his own labour and time in preparing it, but also upon the very tax itself, which he advances to the government; otherwise he loses the use and interest of the money which he so advances.

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To instance in the article of foreign paper. The merchant pays a duty upon importation, which he does not receive again till he sells the commodity, perhaps at the end of three months. He is therefore equally entitled to a profit upon that duty which he pays at the custom-house, as to a profit upon the original price which he pays to the manufacturer abroad; and considers it accordingly in the price he demands of the stationer. When the stationer sells it again, he requires a profit of the printer or bookseller upon the whole sum advanced by him to the merchants: and the bookseller does not forget to charge the full proportion to the student or ultimate consumer; who therefore does not only pay the original duty, but the profits of these three intermediate traders, who have successively advanced it for him. This might be carried much farther in any mechanical, or more complicated, branch of trade.

CUSTOM-HOUSE, an office established by the king's authority in the maritime cities, or port-towns, for the receipt and management of the customs and duties of importation and exportation, imposed on merchandises, and regulated by books of rates.

CUSTOS BREVIUM, the principal clerk belonging to the court of common pleas, whose business it is to receive and keep all the writs made returnable in that court, filing every return by itself; and, at the end of each term, to receive of the prothonotaries all the records of the nisi prius, called the *posseas*.

CUSTOS ROTULORUM, an officer who has the custody of the rolls and records of the sessions of peace, and also of the commission of the peace itself.

He usually is some person of quality, and always a justice of the peace, of the quorum, in the county where he is appointed.

CUSTOS SPIRITUALIUM, he that exercises the spiritual jurisdiction of a diocese, during the vacancy of any see, which, by the canon-law, belongs to the dean and chapter; but at present, in England, to the archbishop of the province, by prescription.

CUSTOS TEMPORALIUM, was the person to whom a vacant see or abbey was given by the king, as supreme lord. His office was, as steward of the goods and profits, to give an account to the exchequer, who did the like to the exchequer.

CUT-A-FEATHER, in the sea-language. If a ship has too broad a bow, it is common to say, *she will not cut a feather*; that is, she will not pass through the water so swift, as to make it foam or froth.

CUT-WATER, the sharp part of the head of a ship below the beak. It is so called because it cuts or divides the water before it comes to the bow, that it may not come too suddenly to the breadth of the ship, which would retard her.

CUTANEOUS, in general, an appellation given to whatever belongs to the cutis, or skin.

CUTICLE, the scarf-skin. See *ANATOMY*, n° 73.

CUTICULAR, the same with *Cutaneous*.

CUTIS, the skin. See *ANATOMY*, n° 75.

CUTTER, a small vessel, commonly navigated in the channel of England. It is furnished with one mast, and rigged as a *sloop*. Many of these vessels are used in an illicit trade, and others are employed by government to take them; the latter of which are

Custom
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Cutter.

Cutter
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Cutting.

either under the direction of the admiralty or custom-house. See a representation of a cutter of this sort in the plate referred to from the article *VESSEL*.

CUTTER, is also a small boat used by ships of war.

CUTTER of the *Tallies*, an officer of the exchequer, whose business is to provide wood for the tallies, to cut or notch the sum paid upon them; and then to cast them into court, to be written upon. See *TALLY*.

CUTTING in wood, a particular kind of sculpture, or engraving; denominated from the matter wherein it is employed. See *ENGRAVING*.

It is used for various purposes; as, for initial or figured letters, head and tail-pieces of books; and even for schemes and other figures, to save the expences of engraving on copper: and for prints, and stamps for paper, calicoes, linens, &c. See *PRINTING*.

The invention of *cutting in wood*, as well as that in copper, is ascribed to a goldsmith of Florence; but it is to Albert Durer, and Lucas, they are both indebted for their perfection.

One Hugo de Carpi invented a manner of cutting in wood, by means whereof, the prints appeared as if painted in clear-obscure. In order to this, he made three kinds of stamps for the same design; which were drawn, after one another, through the press for the same print: they were so conducted, as that one served for the grand lights, a second for the demi-teints, and a third for the outlines, and the deep shadows.

The art of cutting in wood, was certainly carried to a very great pitch about 150 years ago; and might even vie, for beauty and justness, with that of engraving in copper: at present it is in a low condition, as having been long neglected, and the application of artists wholly employed on copper, as the more easy and promising province; not but that wooden cuts have the advantage of those in copper on many accounts; chiefly for figures and devices in books; as being printed at the same time, and in the same press as the letters: whereas, for the other, there is required a particular impression.

The cutters in wood begin with preparing a plank or block, of the size and thickness required, and very even and smooth on the side to be cut: for this, they usually take pear-tree, or box; though the latter is the best, as being the closest, and least liable to be worm-eaten.

On this block they draw their design with a pen, or pencil, just as they would have it printed. Those who cannot draw their own design, as many there are cannot, make use of a design furnished them by another; fastening it upon the block with paste made of flower and water, with a little vinegar; the strokes or lines turned towards the wood.

When the paper is dry, they wash it gently over with a sponge dipped in water; which done, they take off the paper by little and little, still rubbing it a little first, with the tip of the finger; till at length there be nothing left on the block, but the strokes of ink that form the design, which mark out so much of the block as is to be spared, or left standing.

The rest they cut off, and take away very curiously with the points of very sharp knives, or little chisels, or gravers, according to the bigness or delicacy of the work; for they need no other instruments.

Cuttle
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Cyclamen.

CUTTLE-FISH. See *SEPIA*. The bone of the cuttle-fish is hard on one side, but soft and yielding on the other; so as readily to receive pretty neat impressions from medals, &c. and afterwards to serve as a mould for casting metals, which thus take the figure of the original: the bone is likewise frequently employed for cleaning or polishing silver. This fish contains in a certain distinct vessel a fluid as black as ink: which it is said to shed when pursued, and thus to conceal itself by discolouring the water. The particular qualities of this liquor are not yet determined. Dr Leigh says, he saw a letter which had been written with it ten years before, and which still continued. Some report that the ancients made their ink from it, and others, that it is the basis of China, or Indian-ink: but both these accounts appear to have little foundation. Pliny, speaking of the inks made use of in his time, after observing that the cuttle-fish is in this respect of a wonderful nature, adds, expressly, that ink was not made from it.

CYANUS, in botany. See *CENTAUREA*.

CYATHUS, *κύνθος*, from the verb *κύνω*, to pour out. It was a common measure among the Greeks and Romans, both of the liquid and dry kind. It was equal to an ounce, or the twelfth part of a pint. The cyathus was made with an handle like our punch-ladle. The Roman topers were used to drink as many *cyathi* as there were muses, i. e. nine; also as many as there were letters in the patron's name. Thus, they had modes of drinking similar to the modern health-drinking, or toasting. Pliny says, that the cyathus of the Greeks weighed 12 drachms; and Galen says the same; though elsewhere he says, that a cyathus contains 12 drachms of oil, 13 drachms and one scruple of wine, water, or vinegar, and 18 drachms of honey. Galen says, that among the Veterinarii the cyathus contained two ounces.

CYAXARES, king of the Medes, after his father Phraortes, *an. mund.* 3379, besieging Niniveh, he was forced to return to defend his own country against the Scythians, who defeated him. However, he defeated them afterward; and then made himself master of Assyria; entered into Lydia, which had sheltered the Scythians; and died, after 40 years reign.

CYBELÉ, in Pagan Mythology, the daughter of Cælus and Terra, and the wife of her brother Saturn, was also called the mother of the gods, *Ops*, *Rhea*, *Vesta*, *Dyndimina*, *Berecynthia*, the good goddess, &c. in which different characters he had different representations, and different sacrifices.

CYBELICUM MARMOR, a name given by the ancients to a species of marble dug in a mountain of that name in Phrygia. It was of an extremely bright white, with broad veins of bluish black.

CYCLAMEN, *ΣΩΒΕΒΡΕΑ*; a genus of the monogynia order, belonging to the pentandria class of plants. There are but two species; which, however, produce many beautiful varieties. They are low herbaceous, flowery perennials of the tuberous rooted kind, with numerous, angular, heart-shaped, spotted, marbled leaves; with many fleshy foot-stalks fix reflexed high, carrying monopetalous, five-parted inclined flowers of various colours. All the varieties are extremely ornamental, and some of the flowers very fragrant.

fragrant. They may be planted in any of the common borders, but require to be sheltered from hard frosts by being covered with mats. They should also have a light dry soil, otherwise their roots are apt to rot. The species are propagated by seeds, and the particular varieties by dividing their roots.

The root of the cyclamen has, when fresh, an extremely acrimonious, burning taste, which it loses almost entirely on being dried. It is recommended as an emetic; in cataplasms for scorchous and cancerous tumours; as internally as a cathartic, detergent, and aperient. It operates very slowly, but with great violence, inflaming the fauces and intestines.

CYCLE, in chronology, a certain period or series of numbers, which regularly proceed from the first to the last, and then return again to the first, and so circulate perpetually. See ASTRONOMY, n° 303.—308.

CYCLE of *Indiction*, a period of 15 years, in use among the Romans. It has no connection with the celestial motion, but was instituted, according to Baronius, by Constantine; who having reduced the time which the Romans were obliged to serve to 15 years, he was, consequently, obliged every 15 years to impose, or *indicare*, according to the Latin expression, an extraordinary tax for the payment of those who were discharged; and hence arose this cycle, which, from the Latin word *indicare*, was styled *indiction*. *Ibid.*

CYCLE of the *Moon*, called also the *golden number*, and the *Metonic cycle* from its inventor Meton the Athenian, is a period of 19 years, which when they are completed, the new moons and full moons return on the same days of the month, so that on whatever days the new and full moons fall this year, 19 years hence they will happen on the very same days of the month, though not at the same hour, as Meton and the fathers of the primitive church thought; and therefore, at the time of the council of Nice, when the method of finding the time for observing the feast of Easter was established, the numbers of the lunar-cycle were inserted in the calendar, which, upon the account of their excellent use, were set in golden letters, and the year of the cycle called the *golden number* of that year. *Ibid.* n° 304.

CYCLE of the *Sun*, a revolution of 28 years, which being elapsed, the dominical or Sunday-letters return to their former place, and proceed in the same order as before, according to the Julian calendar. See ASTRONOMY, n° 303.

CYCLISUS, in surgery, an instrument in the form of a half moon, used in scraping the skull, in case of fractures of that part.

CYCLOID, a curve on which the doctrine of pendulums, and time-measuring instruments, in a great measure depend; Mr Huygens demonstrated, that from whatever point or height a heavy body, oscillating on a fixed centre, begins to descend, while it continues to move in a cycloid, the time of its falls or oscillations will be equal to each other. It is likewise demonstrable, that it is the curve of quickest descent, *i. e.* a body falling in it, from any given point above, to another, not exactly under it, will come to this point in a less time than in any other curve passing through those two points.

CYCLOPÆDIA, or ENCYCLOPÆDIA, denotes the Cyclopædia circle or compas of arts and sciences. A cyclopædia, say the authors of the French Encyclopædia, ought to explain as much as possible the order and connection of human knowledge.

CYCLOPS, in fabulous history, the sons of Neptune and Amphitrite; the principal of whom were Brontes, Steropes, and Pyracmon; but their whole number amounted to above an hundred. Jupiter threw them into Tartarus as soon as they were born; but they were delivered at the intercession of Tellus, and became the assistants of Vulcan. They were of prodigious stature, and had each only one eye, which was placed in the middle of their foreheads.

Some mythologists say, that the Cyclops signify the vapours raised in the air, which occasion thunder and lightning; on which account they are represented as forging the thunder-bolts of Jupiter. Others represent them as the first inhabitants of Sicily, who were cruel, of a gigantic form, and dwelt round mount Ætna.

CYCLOPTERUS, the *SUCKER*, in ichthyology, a genus belonging to the order of amphibia nantes. The head is obtuse, and furnished with saw-teeth; there are four rays in the gills; and the belly-fins are connected together in an orbicular form. The species are,

1. The *lumpus*, or *lump-fish*, grows to the length of 19 inches, and weighs seven pounds: the shape of the body is like that of the bream, deep and very thick, and it swims edge-ways. The back is sharp and elevated; the belly flat, of a bright crimson colour: along the body there run several rows of sharp bony tubercles, and the whole skin is covered with small ones. The pectoral fins are large and broad, almost uniting at their base. Beneath these is the part by which it adheres to the rocks, &c. It consists of an oval aperture, surrounded with a fleshy, muscular, and obtuse soft substance; edged with many small threaded appendages which concur as so many claspers: the tail and vent-fins are purple. By means of this part it adheres with vast force to any thing it pleases. As a proof of its tenacity, it hath been known, that in flinging a fish of this species just caught, into a pail of water, it fixed itself so firmly to the bottom, that on taking the fish by the tail, the whole pail by that means was lifted, though it held some gallons, without once making the fish quit its hold. These fish resort in multitudes during spring to the coast of Sutherland near the Ord of Caithness. The seals which swarm beneath, prey greatly upon them leaving the skins; numbers of which thus emptied, float ashore at that season. It is easy to distinguish the place where the seals are devouring this or any other unctuous fish, by a smoothness of the water immediately above the spot; this fact is now established: it being a tried property of oil to still the agitation of the waves, and render them smooth. Great numbers of lump-fish are found in the Greenland seas during the months of April and May, when they resort near the shore to spawn. Their roe is remarkably large, which the Greenlanders boil to a pulp and eat. They are extremely fat, which recommends them the more to the natives, who admire all oily food: they call them *nipitsi*, or *cat-fish*, and take quantities of them during

Cyder.

Cyder.

the season. The fish is sometimes eaten in England, being stewed like carp; but is both flabby and insipid.

2. The liparis takes the name of *sea-fnail* from the soft and unctuous texture of its body, resembling that of the land-fnail. It is almost transparent, and soon dissolves and melts away. It is found in the sea near the mouths of great rivers, and hath been seen full of spawn in January. The length is five inches; the colour a pale brown sometimes finely streaked with a darker. Beneath the throat is a round depression of a whitish colour like the impression of a seal, surrounded by twelve small pale yellow tubera by which probably it adheres to the stones like the other species.

3. The lesser sucking-fish is found in different parts of the British seas. It is about four inches in length; the skin without scales, slippery, and of a dusky colour. It hath also an apparatus for adhering to stones and rocks similar to the others.

CYDER, or CIDER, an excellent drink made of the juice of apples, especially of the more curious table kinds; the juice of these being esteemed more cordial and pleasant than that of the wild or harsh kinds. In making this drink it hath long been thought necessary, in every part of England, to lay the harder cyder-fruits in heaps for some time before breaking their pulps; but the Devonshire people have much improved this practice. In other counties the method is to make these heaps of apples in a house, or under some covering inclosed on every side. This method hath been found defective, because, by excluding the free air, the heat soon became too violent, and a great perspiration ensued, by which in a short time the loss of juices were so great, as to reduce the fruit to half their former weight, attended with a general rotteness, rancid smell, and disagreeable taste. In the South-hams, a middle way has been pursued, to avoid the inconveniences and loss attending the above. They make their heaps of apples in an open part of an orchard, where, by the means of a free air and less perspiration, the desired maturity is brought about, with an inconsiderable waste of the juices and decay of the fruit, entirely free of rankness; and though some apples rot, even in this manner, they are very few, and are still fit for use; all continue plump and full of juices, and very much heighten the colour of cyders, without ill taste or smell.

In pursuing the Devonshire method, it is to be observed, 1. That all the promiscuous kinds of apples that have dropped from the trees, from time to time, are to be gathered up and laid in a heap by themselves, and to be made into cedar after having so lain about ten days.

2. Such apples as are gathered from the trees, having already acquired some degree of maturity, are likewise to be laid in a heap by themselves for about a fortnight.

3. The latter hard fruits, which are to be left on the trees till the approach of frost is apprehended, are to be laid in a separate heap, where they are to remain a month or six weeks, by which, notwithstanding frost, rain, &c. their juices will receive such a maturation, as will prepare them for a kindly fermentation, and which they could not have attained on the trees by means of the coldness of the season.

It is observable, that the riper and mellowier the fruits are at the time of collecting them into heaps, the shorter should be their continuance there; and on the contrary, the harrier, immaturer, and harder they are, the longer they should rest.

These heaps should be made in an even and open part of an orchard, without any regard to covering from rain, dews, or what else may happen during the apples staying there; and whether they be carried in and broke in wet or dry weather, the thing is all the same. If it may be objected that during their having lain together in the heap, they may have imbibed great humidity, as well from the air as from the ground, rain, dews, &c. which are mixed with their juices; the answer is, this will have no other effect than a kindly diluting, natural to the fruit, by which means a speedier fermentation ensues, and all heterogeneous humid particles are thrown off.

The apples are then ground, and the pumice is received in a large open-mouthed vessel, capable of containing as much thereof as is sufficient for one making, or one cheese. Though it has been a custom to let the pumice remain some hours in the vessel appropriated to contain it, yet that practice is by no means commendable; for if the fruits did not come ripe from the trees, or otherwise matured, the pumice, remaining in the vat too long, will acquire such harshness and coarseness from the skins as is never to be got rid of; and if the pumice is of well ripened fruit, the continuing too long there will occasion it to contract a sharpness that very often is followed with want of spirit and pricking; nay, sometimes it even becomes vinegar, or always continues of a wheyish colour; all which proceeds from the heat of fermentation that it almost instantly falls in on lying together; the pumice therefore should remain no longer in the vat, than until there may be enough broke for one pressing, or that all be made into a cheese, and pressed the same day it is broken.

Plate LXXXVI. fig. 2. is a perspective view of the cyder-press and apple-mill.

A, B, the bottom, or lower beam; C, D, the upper beam; 5, 6, 7, 8, 9, the uprights; 4, 4, e, e, spurs; Z, 2, 12, braces, or cross pieces; a, b, capitals; X, blocks; g, the screw; E, the back, or receiver; F, the cheele, or cake of pumice, placed on the flage or bafon; G, the flage or bafon; 10, 10, beams that support the pieces of which the bafon is composed; 11, perpendicular pieces for supporting these beams; H, the buckler; R, S, Q, a circular trough of the apple-mill; T, L, V, compartments, or divisions, for different sorts of apples; M, the mill-stone; L, M, axis of the mill-stone; N, the spring-tree bar.

CYDER-Spirit, a spirituous liquor drawn from cyder by distillation, in the same manner as brandy from wine. The particular flavour of this spirit is not the most agreeable, but it may with care be divested wholly of it, and rendered a perfectly pure and insipid spirit upon rectification. The traders in spirituous liquors are well enough acquainted with the value of such a spirit as this: they can give it the flavours of some other kinds, and sell it under their names, or mix it in large proportion with the foreign brady,

rum,

Plate LXXXVI.

Fig.1. CUCULUS Indicator.
OR
Honey Guide.

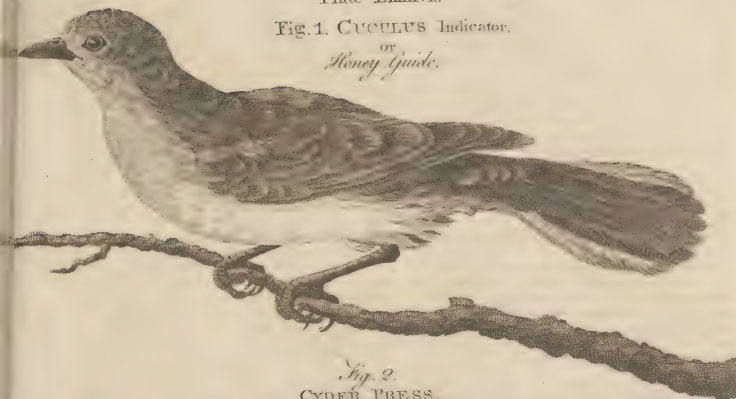
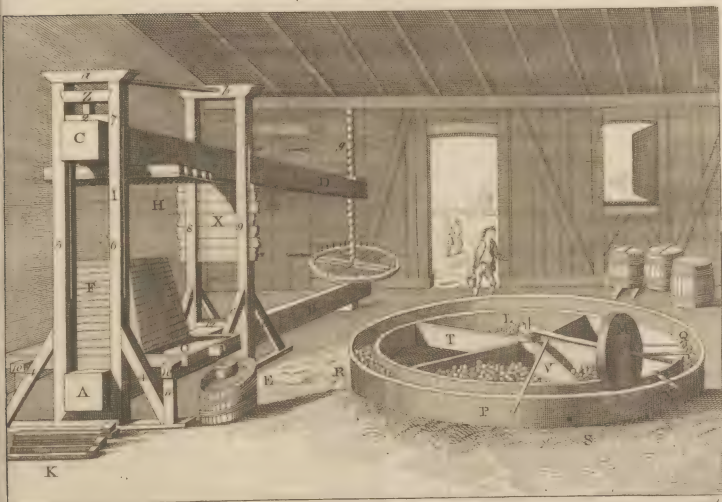


Fig. 2.
CYDER PRESS.



A. Bell's Engraving.



Cydonia
|
Lindrus.

rum, and arrack, in the sale, without any danger of a discovery of the cheat.

CYDONIA, the QUINCE; so called from Cydon, a town of Crete, famous for its abounding with this fruit. Linnæus has joined this genus to the apple and pear; but as there is such a remarkable difference between the fruits, we follow Mr Miller, who treats the quince as a genus by itself.

Species. 1. The oblonga with an oblong fruit, lengthened at the base. 2. The maliforma, with oval leaves woolly on their under side, and lengthened at their base. 3. The lusitanica with overise oval leaves, woolly on their under side. There are some other varieties of this fruit propagated in fruit-gardens, and in the nurseries for sale; one of which is a soft eatable fruit, another very astringent, and a third with a very small fruit cottony all over, which is scarce worth keeping. These Mr Miller supposes to be seminal variations, but the three others to be distinct species. The Portugal quince is the most valuable: its pulp turns to a fine purple when stewed or baked, and becomes much softer and less austere than the others; so is much fitter for making marmalade. The trees are all easily propagated, either by layers, suckers, or cuttings, which must be planted in a moist soil. Those raised from suckers are seldom so well rooted as those which are obtained from cuttings or layers, and are subject to produce suckers again in greater plenty; which is not so proper for fruit-bearing trees. These trees require very little pruning; the chief thing to be observed is, to keep their stems clear from suckers, and cut off such branches as cross each other: likewise all upright luxuriant shoots from the middle of the tree should be taken off, that the head may not be too much crowded with wood, which is of ill consequence to all fruit-trees. These sorts may also be propagated by budding or grafting upon stocks raised by cuttings; so that the best sorts may be cultivated this way in greater plenty than by any other method. These are also in great esteem to bud or graft pears upon; which for summer or autumn fruits are a great improvement to them, especially those designed for walls and espaliers; for the trees upon these stocks do not shoot so vigorously as those upon free-stocks, and therefore may be kept in less compass, and sooner produce fruit: but hard winter-fruits do not succeed so well upon these stocks, their fruit being subject to crack, and are commonly stony, especially all the breaking pears: therefore these stocks are only fit for melting pears and a moist soil.

CYGNUS, or SWAN, in ornithology. See ANAS.

CYGNUS, in astronomy, the *Swan*, a constellation of the northern hemisphere. See ASTRONOMY, n° 206.

CYLINDER, in geometry, a solid body supposed to be generated by the rotation of a parallelogram.

Rolling or Loaded CYLINDER. See MECHANICS, n° 52.

CYLINDROID, in geometry, a solid body, approaching to the figure of a cylinder, but differing from it in some respects, as having the bases elliptical, but parallel and equal.

CYLINDRUS, in natural history, the name of a genus of shell-fish, of which there are many elegant and

precious species. See two specimens on Plate LXXXIII. fig. 4.

CYMA, in botany, the tender stalks which herbs send forth in the beginning of the spring, particularly those of the cabbage kind.

CYMA, or CYMATIUM, in architecture, a member or moulding of the cornice, the profile of which is waved, that is concave at top, and convex at bottom. See Plate XXIX. fig. 7.

CYMBAL, *κymbalon*, a musical instrument in use among the ancients. The cymbal was round, made of brass, like our kettle-drums, and as some think, in their form, but smaller, and of different use. Ovid gives cymbals the epithet of *genialia*, because they were used at weddings and other diversions. The Jews had their cymbals, or at least instruments which translators render cymbals; but as to their matter and form, critics are still in the dark. The modern cymbal is a mean instrument, chiefly in use among vagrants, gypsies, &c.

CYMENE, in botany, a name given by the ancient Greeks to a plant with which they used to dye woolen things yellow, and with which the women of those times used also to tinge the hair yellow, that being the favourite colour in those ages. The *cymene* of the Greeks is evidently the same plant with the *lutea herba* of the Latins; or what we call *dyer's weed*. See RESEDA.

CYNANCHE, a species of quincy, in which the tongue is inflamed and swelled, so that it hangs out beyond the teeth.

CYNANCHUM, RASTARD DOGSBANE; a genus of the digynia order, belonging to the pentandria class of plants. There are six species, of which the following are the most remarkable. 1. The actum, commonly called *Montpelier scammony*; and 2. The *monspeliacum*, or round-leaved Montpelier scammony. They abound with a milky juice like the spurge, which issues out wherever they are broken; and this milky juice when concreted, has frequently been sold for scammony. These plants propagate so fast by their creeping roots, that few people care to admit them into gardens.

CYNANTHROPIA, in medicine, the distemper occasioned by the bite of a mad dog. See (the *Index* subjoined to) MEDICINE.

CYNARA, the ARTICHOKE; a genus of the polygama æqualis order, belonging to the syngenesia class of plants. Of this genus there are four species, but only two are cultivated for use.

1. The scolynius, or garden artichoke, hath large, thick, perennial roots, crowned by a considerable cluster of large pennatifid, erect leaves, two or three feet long. In the middle are upright stalks rising a yard high, on the top of which is a large round scaly head, composed of numerous, oval, calycinal scales, inclosing the florets, sitting on a broad fleshy receptacle, which, with the fleshy base of the scales, is the only eatable part of the plant. The varieties of this species are, (1.) The *conical green-headed French artichoke*, having the small leaves terminated by spines, a tall stalk, the head somewhat conical, and of a light green colour, with the scales pointed at top, opening and turning outward. (2.) The *globular-headed red*, Dutch artichoke,

Cyma.
|
Cynara.

Cynurus
|
Cynicus.

artichok, having leaves without spines, a strong stalk, the head large, globular, a little compressed at top, and of a reddish-green colour; broad obtuse scales emerginated at top, growing close, and turning inward. Of these varieties the last is deservedly the most esteemed, both on account of its superiority in size, and the agreeableness of its flavour. Both varieties are perennial in their root: but the leaves and fruit-stem die to the ground in winter, and their roots remaining send up fresh leaves and stems every summer, producing a supply of artichoks for 20 years if required. The flowers and seed of all the plants of this genus are produced in the centre of the head, the scales of which are the proper calix of the flower, which consists of numerous small bluish florets, succeeded by downy seeds fitting naked on the receptacle.

2. The *cardunculus*, or cardoon, greatly resembles the artichok, but is of larger and more regular growth; the leaves being more upright, taller, broader, and more regularly divided; and the stalks of the leaves blanched are the only eatable parts of the plant.

Culture. Both the varieties of the artichok are propagated by slips or suckers, arising annually from the stool or root of the old plants in spring, which are to be taken from good plants of any present plantation in March, or the beginning of April, and planted in the open quarter of the kitchen-garden, in rows five feet asunder; and they will produce artichoks the same year in autumn. It should, however, be remarked, that though artichoks are of many years duration, the annual produce of their fruit will gradually lessen in the size of the eatable parts after the third or fourth year, so that a fresh plantation should be made every three or four years. The cardoon is a very hardy plant, and prospers in the open quarters of the kitchen-garden. It is propagated by seed sowed annually in the full ground, in March; either in a bed for transplantation, or in the place where they are designed to remain. The plants are very large, so must stand at considerable distances from one another. By this means you may have some small temporary crops between the rows, as of lettuce, spinach, endive, cabbage, fanny, or broccoli plants. In the latter end of September, or in October, the cardoons will be grown very large, and their foot-stalks have acquired a thick substance; you must then tie up the leaves of each plant, to admit of earthing them up closely all round for blanching, which will take up six or eight weeks; and thus the plants will come in for use in November and December, and continue all winter.

CYNÆAS of Theffaly, the scholar of Demosthenes, flourished 275 years before Christ. Pyrrhus had so high an esteem for him, that he sent him to Rome to solicit a peace; and so vast was his memory, that the day after his arrival, he saluted all the senators and knights by name. Pyrrhus and he wrote a treatise of War, quoted by Tully.

CYNICS, a sect of ancient philosophers, who valued themselves upon their contempt of riches and state, arts and sciences, and every thing, in short, except virtue or morality.

The cynic philosophers owe their origin and institution to Antisthenes of Athens, a disciple of Socrates, who, being asked of what use his philosophy had been

to him, replied, "It enables me to live with myself." Diogenes was the most famous of his disciples, in whose life the system of this philosophy appears in its greatest perfection: he led a most wretched life, a tub having served him for a lodging, which he rolled before him where ever he went; yet he was, nevertheless, not the more humble on account of his ragged cloak, bag, and tub: for, one day, entering Plato's house, at a time that there was a splendid entertainment there for several persons of distinction, he jumped up upon a very rich couch, in all his dirt, saying, "I trample on the pride of Plato." "Yes, (replied Plato), but with great pride, Diogenes." He had the utmost contempt for all the human race, for he walked the streets of Athens, at noon-day, with a lighted lantern in his hand, telling the people, "He was in search of a man." Amongst many excellent maxims of morality, he held some very pernicious opinions; for he used to say, that the uninterrupted good fortune of Harpalus, who generally passed for a thief and a robber, was a testimony against the gods. He regarded chastity and modesty as weaknesses; hence Laertius observes of him, that he did every thing openly, whether it belonged to Ceres or Venus, though he adds that Diogenes only ran to an excess of impudence to put others out of conceit with it: but impudence was the characteristic of these philosophers, who argued, that what was right to be done, might be done at all times, and in all places. The chief principle of this sect, in common with the stoics, was, that we should follow nature; but they differed from the stoics in their explanation of that maxim, the cynics being of opinion that a man followed nature, that gratified his natural motions and appetites; while the stoics understood right reason, by the word nature.

CYNIC *Spasmus*, a kind of convulsion, wherein the patient imitates the howlings of dogs.

CYNOCEPHALUS, in zoology, the trivial name of a species of SIMIA.

CYNOGLOSSUM, HOUND'S TONGUE; a genus of the monogynia order, belonging to the pentandria class of plants. Their are eight species, none of them remarkable for their beauty. The root of one of them, *viz.* the officinale, or common greater hound's tongue was formerly used in medicine, and supposed to possess narcotic virtues; but it is discarded from the present practice. The smell of the whole plant is very disagreeable. Goats eat it; sheep, horses, and swine refuse it.

CYNOREXY, an immoderate appetite, to the degree of a disease; called also *fames canina*, and *bulimy*.

CYNOSURA, in astronomy, a denomination given by the Greeks to *ursa minor*, or "the little bear," by which sailors steer their course. The word is formed of *κυνος*, *q. d. the dog's tail*. This is the constellation next our pole, consisting of seven stars; four whereof are disposed like the four wheels of a chariot, and three lengthwise representing the beam; whence some give it the name of the *chariot*, or *Charles's wain*.

CYNOSURUS, in botany, a genus of the triandria dyginia class. There are ten species, four of which are natives of Britain, *viz.* the *cristatus*, or crested dog-tail

Cynic
|
Cynosurus.

pernis.
Cyprianus.

dog-tail grafs; the echinatus, or rough dog-tail grafs; the cæruleus, or blue dog-tail grafs; and the paniceus, or bearded dog-tail grafs.

CYPHERUS, in botany, a genus of the monogynia order, belonging to the pentandria class of plants. There are 20 species, the only remarkable are the round and the long sweet cyperus. The former is a native of the East Indies, and grows by the sides of rivulets, ditches, and the like. The root is knotty, wrapped round with fibrous strings not easy to break, of a brown colour without, and grey within; of a pleasant scent, especially when fresh, and well dried; the leaves are green, and resemble those of the reed and leek. The latter, commonly called *English*, or *Flemish cyperus*, grows in the water, and along banks and river sides. Its root is as thick as an olive, full of little knots or specks, of an oblong figure, grey colour; sweet, and somewhat sharp taste, and almost without smell when it is newly taken out of the ground. The roots of both plants are esteemed cordial, diuretic, and cephalic, resisters of poisons, and expellers of wind. Long cyperus is much used by perfumers and glovers.

CYPRÆA, in zoology, a genus of insects belonging to the order of vermes testacea. It is an animal of the limax or snail kind; the shell is one involuted, subovated, obtuse, smooth valve. The aperture on each side is linear, longitudinal, and toothed. There are forty-four species, distinguished by the form of their shells. The pediculus, or common gowrie, is represented Plate LXXXII. fig. 14.

This genus is called *cypræa*, and *venerea*, from its being peculiarly dedicated to Venus; who was said to have endowed a shell of this genus with the powers of a *remora*, so as to impede the course of the ship which was sent by Periander tyrant of Corinth, with orders to castrate the young nobility of Corcyra.

CYPRESS. See CUPRESSUS.

CYPRIANUS (Thascius-Cæcilius), a principal father of the Christian church, was born at Carthage in Africa, at the latter end of the second or beginning of the third century. We know nothing more of his parents than that they were heathens; and he himself continued such till the last 12 years of his life. He applied himself early to the study of oratory; and some of the ancients, particularly Lactantius, inform us, that he taught rhetoric in Carthage with the highest applause. Cyprian's conversion is fixed by Pearson to the year 246; and was at Carthage, where, as St Jerome observes, he had often employed his rhetoric in the defence of paganism. It was brought about by one Cæcilius, a priest of the church of Carthage, whose name Cyprian afterwards took; and between whom there ever after subsisted so close a friendship, that Cæcilius at his death committed to Cyprian the care of his family. Cyprian was also a married man himself; but as soon as he was converted to the faith, he resolved upon a state of continence, which was thought a high degree of piety, as not being yet become general. Being now a Christian, he was to give the usual proof of the sincerity of his conversion; and that was by writing against paganism and in defence of Christianity. With this view he composed his piece *De Gratia Dei*, or "concerning

the grace of God," which he addressed to Donatus. It is a work of the same nature with the Apologetic of Tertullian, and the Oclavius of Minutius Felix. He next composed a piece *De Idolorum Vanitate*, or "upon the vanity of idols." Cyprian's behaviour, both before and after his baptism, was so highly pleasing to the bishop of Carthage, that he ordained him a priest a few months after. It was rather irregular to ordain a man thus in his very novitiate; but Cyprian was so extraordinary a person, and thought capable of doing such singular service to the church, that it seemed allowable in his case to dispense a little with the form and discipline of it. For besides his known talents as a secular man, he had acquired a high reputation of sanctity since his conversion; having not only separated himself from his wife, as we have observed before, which in those days was thought an extraordinary act of piety, but also consigned over all his goods to the poor, and given himself up entirely to the things of God. It was on this account no doubt, too, that when the bishop of Carthage died the year after, that is, in the year 248, none was judged so proper to succeed him as Cyprian. The quiet and repose which the Christians had enjoyed during the last 40 years, had, it seems, greatly corrupted their manners; and therefore Cyprian's first care, after his advancement to the bishopric, was to correct disorders and reform abuses. Luxury was prevalent among them; and many of their women were not so strict as they should be, especially in the article of dress. This occasioned him to draw up his piece *De habitu virginum*, or "concerning the dress of young women;" in which, besides what he says on that particular head, he inculcates many lessons of modesty and sobriety. In the year 249, the emperor Decius began to issue out very severe edicts against the Christians, which particularly affected those upon the coast of Africa; and in the beginning of 250, the heathens, in the circus and amphitheatre of Carthage, insisted loudly upon Cyprian's being thrown to the lions: a common method of destroying the primitive Christians. Cyprian upon this withdrew from his church at Carthage, and fled into retirement, to avoid the fury of the persecutions. He wrote in the place of his retreat, pious and instructive letters to those who had been his hearers; and also to the *libellatici*, a name by which those pusillanimous Christians were called, who procured certificates of the heathen magistrates, to shew that they had complied with the emperor's orders in sacrificing to idols. At his return to Carthage he held several councils on the repentance of those who had fallen during this persecution, and other points of discipline; he opposed the schemes of Novatus and Novatianus; and contended for the rebaptizing of those who had been baptized by heretics. At last he died a martyr in the persecution of Valerian and Gallienus, in 258. Cyprian wrote 81 letters, and several treatises. The best edition of his works are those of Pamelius in 1568; of Rigaltius in 1648; and of Oxford in 1682. His works have also been translated into English by Dr Marshall.

CYPRINUS, in ichthyology, a genus of fishes, belonging to the order of abdominales. The mouth is toothless; there are three rays in the gills; the body

Cyprianus
Cyprianus.

Cyprinus. is smooth and white; and the belly-fins have frequently nine rays. There are 31 species, principally distinguished by the number of rays in the vent-fin. The most remarkable are,

1. The carpio, or carp. This was introduced into England about the year 1514, by *Leonard Maschal*, to whom we are also indebted for that excellent apple the *pippin*. *Ruffia* wants these fish at this day. Sweden has them only in the ponds of people of fashion. They chiefly abound in the rivers and lakes of Polish Prussia, where they are sometimes taken of a vast size. They are there a great article of commerce, and sent in well-boats to Sweden and Russia. The merchants purchase them out of the waters of the noblesse of the country, who draw a good revenue from this article. The ancients do not separate the carp from the sea-fish. They are sometimes found in the harbour of Dantzic between the town and a place called *Helia*.

Carp are very long-lived. *Gesner* brings an instance of one that was near 100 years old. They grow also to a very great size; some authors speak of carp weighing 200 pounds weight, and five feet in length. The carp is a prodigious breeder: its quantity of roe has been sometimes found so great, that when taken out and weighed against the fish itself, the former has been found to preponderate. From the spawn of this fish, caviare is made for the Jews, who hold the sturgeon in abhorrence. The carp is extremely cunning, and on that account is sometimes styled the *river-fox*. They will sometimes leap over the nets and escape that way; at other times they will immerse themselves so deep in the mud as to let the net pass over them. They are also very shy in taking a bait; yet at the spawning-time they are so simple as to suffer themselves to be tickled, handled, and caught by any body that will attempt it. This fish is apt to mix its milk with the roe of other fish; from which is produced a spurious breed, as has been observed in the offspring of the carp and tench, which bore the greatest resemblance to the first. The same has also been observed of the carp and bream.

In Polish Prussia, and many other parts of Germany, the sale of carp constitutes a part of the revenue of the nobility and gentry: so that the proper management of that fish is reduced to a kind of system, founded on the experience of several generations; of the methods there practised, we have an account in the Philosophical Transactions for 1771, art. 37, communicated by Mr J. Reinhold-Forster; who says, he has seen carp treated and maintained according to those methods, "above a yard long, and of 25 pounds weight:" but had no opportunity of ascertaining their age. "In the pond, however, at Charlottenburg, (he adds), a palace belonging to the king of Prussia, I saw more than two or three hundred carp, between two and three feet long; and I was told by the keeper they were between 50 and 60 years standing. They were tame, and came to the shore in order to be fed; they swallowed with ease a piece of white bread, of the size of half a halfpenny roll."—Mr Forster, in this paper, also vouches a most extraordinary circumstance, namely, the possibility of the carp's not only living for a considerable time out of water, but of its growing fat in its new element. The author has seen the ex-

periment successfully tried, and attended to the whole process, in a nobleman's house where he then resided, in the principality of Anhalt-Deßau. The fish being taken out of the water, is wrapped up in a large quantity of wet mofs, spread on a piece of net, which is then gathered into a purse; in such a manner, however, as to allow him room to breathe. The net is then plunged into water, and hung up to the ceiling of a cellar. At first the dipping must be repeated every three or four hours; but afterwards the carp need only to be plunged into the water once in about six or seven hours. Bread soaked in milk is first given him in small quantities. In a short time, the fish will bear more, and grow fat under this seemingly unnatural treatment. Mr Daines Barrington, in a note, confirms a part of the preceding account, by mentioning the practice of a certain fish-monger near Claremarket, who, in the winter, frequently exposes a bushel at least of carp and tench, for sale, in the same dry vessel, for six or seven hours; many of which are not sold, and yet continue in health, though breathing nothing but air, during the time above mentioned, for several days successfully.

2. The barbus, or barbel, is so extremely coarse as to be overlooked by the ancients till the time of the poet Ausonius, who gives it no great character. They frequent the still and deep parts of rivers, and live in society, rooting like swine with their noses in the soft banks. It is so tame as to suffer itself to be taken by the hand; and people have been known to take numbers by diving for them. In summer they move about during night in search of food; but towards autumn, and during winter, confine themselves to the deepest holes. The barbel is about the length of three feet, and will weigh 18 pounds; the belly white; the dorsal fin is armed with a remarkably strong spine, sharply serrated, with which it can inflict a very severe and dangerous wound on the incautious handler, and even do much damage to nets. They are the worst and coarsest of fresh-water fish, and seldom eat but with the poorer sort of people, who sometimes boil them with a bit of bacon to give them a relish. Their roe is very noxious, affecting those who unwarily eat of it with a nausea, vomiting, purging, and a slight swelling.

3. The tinca, or tench, was treated with the same disrespect by the ancients as the barbel; but is now in much more repute. It has by some been called the *physician* of the fish, and its slime has been said to be of so healing a nature, that the wounded fishes apply it as a styptic. In this country it is reckoned a wholesome and delicious food; but the Germans are of a different opinion. By way of contempt they call it the *shoemaker*. *Gesner* even says, that it is insipid and unwholesome. It does not commonly exceed four or five pounds in weight, though some have been known to weigh ten or twenty. They love still waters, and are rarely found in rivers: they are very foolish and easily caught. The tench is thick and short in proportion to its length. The colour of the back is dusky; the dorsal and ventral fins of the same colour; the head, sides, and belly, of a greenish cast, most beautifully mixed with gold, which is in its greatest splendor when the fish is in the highest season.

Cyprinus.

4. The gudgeon is generally found in gentle streams, and is of a small size, the largest not exceeding half a pound weight. They bite eagerly; and are assembled by raking the bed of the river; to this spot they immediately crowd in shoals, in expectation of food.

5. The bream, or bream, is an inhabitant of lakes, or the deep parts of still rivers. It is a fish that is very little esteemed, being extremely infidid.

6. The rutilus, or roach, is a common fish, found in many of the deep still rivers of this country. They are gregarious, keeping in large shoals. It has never been known to exceed five pounds in weight.

7. The leuciscus, or dace, like the roach is gregarious, haunts the same places, is a great breeder, very lively, and during summer is very fond of frolicking near the surface of the water. It never exceeds the weight of a pound and an half: the scales are smaller than those of the roach.

8. The cephalus, or chub, is a very coarse fish and full of bones. It frequents the deep holes of rivers; and in summer commonly lies on the surface beneath the shade of some tree or bush. It is very timid, sinking to the bottom on the least alarm, even at the passing of a shadow; but they will soon resume their former situation. It feeds on worms, caterpillars, grass-hoppers, and other coleopterous insects that happen to fall into the water; and it will even feed on cray-fish. It will rise to a fly. Some of this kind have been known to weigh eight or nine pounds.

9. The alburnus, or bleak. These fish are very common in many of our rivers, and keep together in large shoals. At certain seasons these fish seem to be in great agonies: they tumble about near the surface of the water, and are incapable of swimming far from the place; but in about two hours they recover and disappear. Fish thus affected, the Thames fishermen call *mad* bleaks. They seem to be troubled with a species of *gordius*, or hair-worm, which torments them so, that they rise to the surface and then die. The bleak seldom exceeds five or six inches in length. Artificial pearls are made with the scales of this fish, and probably also with those of the dace. They are beat into a fine powder, then diluted with water, and introduced into a thin glass bubble, which is afterwards filled with wax. The French were the inventors of this art.

During the month of July there appear in the Thames, near Blackwall and Greenwich, innumerable multitudes of small fish, known to the Londoners by the name of *white bait*. They are esteemed very delicious when fried with fine flour, and occasion, during the season, a vast resort of the lower order of epicures to the taverns at the places where they are taken at. There are various suppositions concerning these fishes, all of which terminate in reckoning them the fry of some other fish. Mr Pennant thinks they are of the carp kind, though he cannot determine the species to which they belong. They have a greater similarity to the bleak than to any other, but he thinks they cannot be the young fry of this species; because the bleak is found in many of the British streams, but the white bait only in the Thames. The usual length of this fish is only two inches.

10. The auratus, or golden fish, are now quite na-
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turalized in Britain, and breed as freely in the open waters as the common carp. They were first introduced into England about the year 1691, but were not generally known till 1728, when a great number were brought over, and presented first to Sir Matthew Dekker, and by him circulated round the neighbourhood of London, from whence they have been distributed to most parts of the country. They come originally from China. The most beautiful kinds are taken in a small lake in the province of Che-kyang. Every person of fashion keeps them for amusement, either in porcelain vessels, or in the small basins that decorate the courts of the Chinese houses. The beauty of their colours, and their lively motions give great entertainment, especially to the ladies, whose pleasures, by reason of the cruel policy of that country, are extremely limited. In form of the body, the golden fishes bear a great resemblance to the carp. They have been known in this island to arrive at the length of eight inches; but in their native place they are said to grow to the size of the largest herring. The colours vary greatly; some are marked with a bright blue, with brown, and with bright silver; but the general colour is gold, of a most amazing splendor.

CYPRÆDIUM, the LADY'S SLIPPER, in botany; a genus of the diandria order, belonging to the gynandria class of plants. There are three species; of which only one, *viz.* the calceolus, is a native of Britain. It grows in rough ground, in different parts of the island. The other species are natives of America. None of them are easily propagated in gardens, and therefore must be transplanted from those places where they are natives.

CYPRUS, an island situated in the Levant, or most easterly part of the Mediterranean sea, between 33 and 36 degrees of east longitude, and 30 and 34 of north latitude. In ancient times this island was known by the names of *Acamis*, *Ceraftis*, *Aspalia*, *Amathus*, *Macaria*, *Cryptos*, *Colinia*, *Sphecia*, *Paphia*, *Salamina*, *Ærofa*, and *Cyprus*. The etymologies of these names are neither very easily found, nor are they of much importance. The name by which it was most generally known is that of *Cyprus*, said to be derived from *cyprus*, the name of a shrub with which the island abounded; but what kind of shrub that was, is still disputed.

Cyprus, according to Eratosthenes, was first discovered by the Phœnicians, two or three generations before the days of Aslerius and Minos kings of Crete; that is, according to Sir Isaac Newton's computation, 2006 years before the Christian Æra. - It was at that time so full of wood that it could not be tilled, and the Phœnicians first cut down that wood for melting copper, with which the island abounded; and afterwards, when they began to sail without fear on the Mediterranean, that is, after the Trojan war, they built great navies of the wood produced on the island. Josephus, however, informs us, that the descendants of *Cittim*, the son of Javan, and grandson of Japhet, were the original inhabitants of Cyprus. According to his account, *Cittim*, seeing his brother *Tarshish* settled in Cilicia where he built the city of *Tarfus*, settled with his followers in this opposite island; and there

Cyprus.

ther he or his descendants laid the foundations of the city of *Citium*, which, according to Ptolemy was the most ancient in the island. As Cyprus was too narrow to contain the great numbers who attended him, he left here as many as might serve to people the country, and with the rest passed over into Macedon.

The island of Cyprus was divided among several petty kings till the time of Cyrus the Great. He subdued them all; but left each in possession of his kingdom, obliging them only to pay him an annual tribute, and to send supplies of men, money, and ships when required. The Cyprian princes lived thus subject to the Persians till the reign of Darius Hytaspes, when they attempted to shake off the yoke, but with bad success; their forces being entirely defeated, and themselves again obliged to submit. They made another more successful attempt about the year before Christ 357; but, however, could never totally free themselves from their subjection. It is very probable that they submitted to Alexander the Great, though historians are silent as to that event. On the death of the Macedonian conqueror, the dominion of Cyprus was disputed by Antigonus and Ptolemy the son of Lagos. At last Antigonus prevailed, and the whole island submitted to him about 304 years before Christ. He and his son Demetrius kept possession of it for 11 years, when it was recovered by Ptolemy, and quietly possessed by him and his descendants till 58 years before Christ, when it was most unjustly seized by the Romans. In the time of Augustus, it began to be ranked among the provincial provinces, and to be governed by magistrates sent thither by the senate. In the year 648, it was conquered by the Saracens; but recovered by the Romans in 957. They held it, however, but for a very short time, and the barbarians kept possession of it till the time of the croisades. It was then reduced by the croisaders; and Richard I. of England gave it to the princes of the Lusignan family, who held it till the year 1570. They divided it into 12 provinces, in each of which was a capital city from which the province was denominated. So considerable was the island at this time, that besides the cities above mentioned, and others of less note, it contained 800 villages. In 1570, it was taken by the Turks, and though it hath ever since continued under their tyrannical yoke, is still so considerable as to be governed by a beglerbeg, and seven sangiacs under him.

The air in this island is for the most part very unwholesome, on account of the many fens and marshes with which the country abounds. The soil is an excellent fertile clay; and would produce all the necessaries of life in abundance, if properly cultivated. There are no rivers in the country; but that defect is supplied by abundance of springs. By reason of the uncultivated state of the country, they are also greatly infested with poisonous reptiles of various kinds. The people are extremely ignorant, and lascivious, as indeed they are remarked to have been from the remotest antiquity. Anciently the worship of Venus was established in this island, whence her title among the poets of the *Cyprian queen*; and such an inclination had the inhabitants to become the votaries of this goddess, both in theory and practice, that the young women used to prostitute themselves in her temple in

order to raise themselves portions. Nor are their successors said to be much better at this day. The exports of the island are silks, wool, amber, and wine; the imports are French and Venetian broad cloths; and sometimes a few bales of English manufacture, cutlery wares, sugar, tin, lead, &c.

Knight of Cyprus, an order instituted by Guy de Lusignan, titular king of Jerusalem, to whom Richard I. of England, after conquering this island, made over his right.

CYRANO (Bergerac), a French author, born in Gascony, about the year 1620. He first entered into the army, where his natural courage engaged him frequently in duels in the quality of a second; which, with other rash actions, procured him the title of the *Intrepid*. But the little prospect he saw of preferment made him renounce the trade of war for the exercise of wit. His comic histories of the states and empires in the sun and moon, shew him well acquainted with the Cartesian philosophy and to have a lively imagination. Our lord Orrery classed him with Swift for his turn of humour, which he says the latter adopted and pursued.

CYRENAICA, an ancient kingdom of Africa, corresponding to the present kingdom and desert of Barca and Tripoli. It was originally inhabited by a number of barbarous nations, differing little from great gangs of robbers. Afterwards some colonies from Greece settled here, and Cyrenaica became so powerful a state, that it waged war with Egypt and Carthage, often with success. In the time of Darius Hytaspes, Arceilaus, the reigning prince in Cyrenaica was driven from the throne; on which his mother Pheretima applied for assistance to the king of Cyprus. Her son afterwards returning to Barca, the chief city of Cyrene, was there assassinated, together with his father-in-law. Pheretima finding herself disappointed by the king of Cyprus, applied to Darius Hytaspes, and by the assistance of the Persians reduced Barca. Here she behaved with the utmost cruelty, causing all those who had been concerned in her son's death to be impaled, and the breasts of their wives to be cut off and affixed near them. She is said to have been afterwards devoured by worms; which was looked upon as a divine judgement for her excessive cruelty. The prisoners in the mean time were sent to Darius, who settled them in a district of Bactria, from them called *Barca*. Cyrenaica, however, seems to have remained free till the time of Alexander the Great, who conquered it along with Egypt. Soon after his death the inhabitants recovered their liberty; but were in a short time reduced by Ptolemy king of Egypt. Under these kings it remained till Ptolemy Physcon made it over to his bastard son Apian, who in the 658th year of Rome left it by will to the Romans. The senate permitted all the cities to be governed by their own laws; and this immediately filled the country with tyrants, those who were most potent in every city or district, endeavouring to assume the sovereignty of it. Thus the kingdom was thrown into great confusion; but Lucullus in a good measure restored the public tranquillity on his coming thither during the first Mithridatic war. It was found impossible, however, totally to suppress these disturbances till the country was reduced to the form

Cyprus

Cyrenaica.

of a Roman province, which happened about 20 years after the death of Apian, and 76 before Christ. Upon a revolt, the city of *Cyrene* was ruined by the Romans; but they afterwards rebuilt it. In process of time it fell to the Arabs; and then to the Turks, who are the present masters of it.

CYRENAICS, a sect of ancient philosophers, so called from their founder, Aristippus of Cyrene, a disciple of Socrates.

The great principle of their doctrine was, that the supreme good of man in this life is pleasure; whereby they not only meant a privation of pain, and a tranquillity of mind, but an assemblage of all mental and sensual pleasures, particularly the last.

CYRIL (S^t) bishop of Jerusalem, succeeded Maximus in 350. He was afterward deposed for the crime of exposing to sale the treasures of the church, and applying the money to the support of the poor during a great famine. Under Julian he was restored to his see, and was firmly established to all his old honours and dignities under Theodosius; in which he continued unmolested to his death in 386. The remains of this father consist only of 23 catecheses, and one letter to the emperor Constantius.

CYRILL (S^t) patriarch of Alexandria, succeeded Theophilus, his uncle, in 412. Scarce was he installed, when he began to exert his authority with great vigour; he drove the Novatians and Jews from Alexandria, permitting their wealth and synagogues to be taken from them. This proceeding highly displeased Orestes, the governor of the city, who saw that if the bishop's authority was not soon suppressed it might grow too strong for that of the magistrate. Upon which a kind of civil war broke out between Orestes and the bishop; many tumults were raised, and some battles fought in the very streets of Alexandria. St Cyrill also distinguished himself by his zeal against Nestorius bishop of Constantinople, who, in some of his homilies, had asserted that the virgin Mary ought not to be called the mother of God. The dispute at first proved unfavourable to Cyrill, whose opinion was not only condemned, but himself deprived of his bishopric and thrown into prison. But he was soon after released, and gained a complete victory over Nestorius, who in 431 was deposed from his see of Constantinople. Cyrill returned to his see at Constantinople, where he died in 444. St Cyrill also wrote against Theodorus of Moplaesta, Diodorus of Tarsus, and Julian the apostate. He composed commentaries on St John's gospel, and wrote several other books. His works were published in Greek and Latin in 1638, in six volumes folio.

CYRUS I. and II. kings of Persia. See (*History of*) PERSIA.

CYST, the bag, or tunic, including all incysted tumors, as the scirrhus, atheroma, steatoma, melicer, &c.

CYSTIC, in anatomy, a name given to two arteries and two veins.

CYSTIC DUCT. See ANATOMY, n^o 358, c.

CYTHEREA, a name of Venus, so called from Cythera an island of Greece, where poets say she was formed of the froth of the sea. She had a sumptuous temple there consecrated to her under the name of Venus Urania.

CYTISUS, TREE REPOIL: a genus of the decandria order, belonging to the diadelphia class of plants.

There are 11 species, of which the most remarkable are, 1. The laburnum, or large deciduous cytissus, hath a large upright tree-stem, branching into a full-spreading head, 20 or 30 feet high, having smooth greenish branches, oblong oval entire leaves, growing by threes on long slender foot-stalks; and from the sides of all the branches, numerous yellow flowers collected into long spikes, hanging loosely downward, and appearing in May. 2. The sessilifolius, often called *cytissus secundus clusii*, have a low shrubby stem dividing into numerous erect brownish branches, forming a bushy head five or six feet high, garnished with small oval leaves growing by threes; some on very short foot-stalks, others sitting close; and bright yellow flowers in short erect spikes at the ends of the branches, appearing in June. 3. The nigricans grows with a short shrubby stem, dividing low into many erect slender branches, forming a bushy head four or five feet high, with oblong, oval, trifoliate leaves, and yellow flowers, terminating all the branches in upright spikes, appearing in July. 4. The hirsutus, or hairy evergreen: Neapolitan cytissus, rises with an upright shrubby grey stem, sending out many erect greenish hairy branches, forming a fine head six or eight feet high, closely garnished with small hairy trifoliate leaves on short foot-stalks, and yellow flowers from the sides of the branches in short pendulous spikes, appearing in June. 5. The Austriacus, Austrian, or Tartarian evergreen cytissus, hath a shrubby stem, dividing low into many greenish branches, forming a bushy head three or four feet high, having smooth whitish-green leaves, and bright yellow flowers in close umbellate heads at the ends of the branches, having a cluster of leaves under each head. These flowers appear in May.

Culture, &c. All the sorts are hardy, and will prosper in any common soil and exposure; though, as the hirsutus is sometimes affected by severe frost, it should have a dry soil, and a somewhat sheltered situation. They may all be propagated by seeds or cuttings, and all the culture they require in the nursery is to have the ground kept clear from weeds, and dug annually between the rows. Though they are generally considered only as ornamental shrubs, yet the first species, if originally trained to a stem, and suffered to stand, will grow to the size of pretty large timber trees. They grow naturally on the Alps, the mountains of Dauphine, and the highlands of Scotland; and the timber being very hard, and taking a fine polish, is frequently used for making chairs, tables, bed-steads, and other furniture; and is said to equal the finest mahogany in beauty. A species of cytissus, called by Linnæus *cytissus cajan*, is known in the West Indies, where it is a native, by the name of the *pigeon-pea*, from the seeds being the common food of these birds in that part of the world. These seeds are also sometimes used as food for the human species; and as they are of a very binding quality, afford a wholesome nourishment during the wet season, when dysenteries are so frequent.

CZACKTHURN, a strong town of Germany, in Austria, and near the frontiers of Hungary. It is seated between the rivers Drave and Muhr, in E. Long.

- Czar** Long. 17. 19. N. Lat. 46. 24.
- CZENSTOKOW** **CZAR**, a title of honour assumed by the great dukes, or, as they are now styled, *emperors of Russia*. Beckman makes no doubt but they took this title, by corruption, from *Cæsar*, emperor; and accordingly they bear an eagle, as the symbol of their empire, and the word *Cæsar* in their arms.
- CZASLAU**, a town of Bohemia, and capital of a circle of the same name. Here is the highest tower in all Bohemia; and near this place the king of Prussia gained a victory over the Austrians in 1742. It is seated on the river Crudenka, in E. Long. 15. 33. N. Lat. 49. 50.
- CZENSTOKOW**, a town of Poland in the palatinate of Cracovia, with a fort, in which they keep a rich treasure, called "the treasure of the virgin Mary." The pilgrims flock hither so much for the sake of a convent near it, that it is called the *Loretto* of Poland. The town is situated on the river Warta, in E. Long. 19. 15. N. Lat. 50. 48.
- CZERNIC**, a town of Carniola, in Austria, situated in E. Long. 15. 0. N. Lat. 46. 12. It is remarkable for its lake, for a particular description of which see the article *ZIRCHNITZER*.
- CZERNIKOU**, a considerable town of Muscovy, and capital of a duchy of the same name, with a castle. It is seated on the river Dezna, in E. Long. 32. 13. N. Lat. 51. 20.
- CZONGRODT**, a town of upper Hungary, and capital of a territory of the same name, at the confluence of the rivers Teisse and Keres. E. Long. 20. 57. N. Lat. 46. 50.

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N. B. ERRATA, OMISSIONS, &c. noticed and supplied in the APPENDIX at the end of the Work.

